Colour television

Chassis

A02E

AA

Service
Service
Service

ServiceManual

Contents

Page
1 Technical Specifications, Connection Facilities, and Chassis Overview 2
2 Safety and Maintenance Instructions, Warnings, and Notes 4
3 Directions for Use 6
4 Mechanical Instructions 12
5 Service Modes, Error Codes, and Faultfinding 14
6 *Block Diagrams, Testpoint Overview, and Waveforms*
Wiring Diagram 23
Block Diagram LSP Supply and Deflection 24
Testpoint Overview LSP and CRT 25
Block Diagram 1 Audio & Video 26
Block Diagram 2 Audio & Video 27
Block Diagram 3 Audio & Video 28
Testpoint Overview SSB 29
I²C Overview 30
Supply Lines Overview 31
7 *Circuit Diagrams and PWB layouts* *Diagram* *PWB*
LSP: Main Supply (Diagram A1A) 32 42-47
LSP: Main Supply (Diagram A1B) 33 42-47
LSP: Standby Supply (Diagram A2) 34 42-47
LSP: Line Deflection (Diagram A3) 35 42-47
LSP: Frame Defl. E/W Drive (Diagram A4) 36 42-47
LSP: Rotation Circuitry (Diagram A5) 37 42-47
LSP: Audio Amplifier (Diagram A6) 38 42-47
LSP: Headphone Amplifier (Diagram A7) 37 42-47
LSP: Tuner, SIMM Conn.(Fem.) (Diagram A8) 39 42-47
LSP: Front (Diagram A10) 40 42-47
LSP: Inputs/Outputs (Diagram A11) 41 42-47

Contents Page
SSB: If & SAW Filter (Diagram B1) 48 64-73
SSB: Vid. Source Sel/Data Link (Diagram B2) 49 64-73
SSB: Audio Source Select (Diagram B3) 50 64-73
SSB: MPIF-Supply, E/W, Ctrl (Diagram B4) 51 64-73
SSB: Video Decoder (Diagram B5) 52 64-73
SSB: Feature Box (Diagram B6) 53 64-73
SSB: RGB Processing (Diagram B7) 54 64-73
SSB: Sync & Deflection Proc. (Diagram B8) 55 64-73
SSB: Protection (Diagram B9) 56 64-73
SSB: Audio Processing (Diagram B10) 57 64-73
SSB: Control (Diagram B11) 58 64-73
SSB: Ctrl-Mem. Int. (EBIU) (Diagram B12) 59 64-73
SSB: Ctrl-Mem. Int. (SDRAM) (Diagram B13) 60 64-73
SSB: ADOC Supply (Diagram B14) 61 64-73
SSB: Low Volt. Supply ADOC (Diagram B15) 62 64-73
SSB: Connector Interface (Diagram B18) 63 64-73
Side I/O Panel (Diagram D) 74 75
Top Control Panel (Diagram E) 76 77
CRT Panel (Diagram F) 78 79
DC-Shift Panel (Diagram G) 80 80
VDAF + 2nd Orders (Diagram I) 81 82
Front Interface (Diagram J) 83 84
8 Electrical Alignments 85
9 Circuit Descriptions 92
List of Abbreviations 105
IC Data Sheets 107
10 Spare Parts List 108
11 Revision List 114

©Copyright 2003 Philips Consumer Electronics B.V. Eindhoven, The Netherlands.
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, or otherwise without the prior permission of Philips.

Published by RB 0371 Service PaCE

PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

Index of this chapter:
1. Technical Specifications
2. Connections
3. Chassis Overview

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

1.1 Technical Specifications

1.1.1 Vision

Display type	: CRT, Real Flat
Screen size(s)	: 28 inch - 16:9
	: 29 inch - 4:3
	: 32 inch - 16:9
Tuning system	: PLL
IF frequency	: 38.9 MHz
Colour systems	: PAL: B/G,D/K,I
	: SECAM: B/G,D/K,L/L'
	: NTSC-playback
Channel selections	: 100 presets
	: UVSH
Aerial input	: 75 ohm, IEC-type

1.1.2 Sound

Sound systems	: FM-mono, AM-mono
	: FM-stereo: B/G
	: NICAM: B/G,D/K,I,L
Maximum power	: 4 x 10 W_rms (int.)

1.1.3 Miscellaneous

Mains voltage	: 220 - 240 Vac
Mains frequency	: 50 / 60 Hz
Ambient temperature	: +5 to +45 deg. C
Maximum humidity	: 90 % R.H.
Power consumption	:
- Normal operation	: ≈ 115 W
- Standby	: < 1 W

1.2 Connections

1.2.1 Front and Top Control, Side I/O Connections

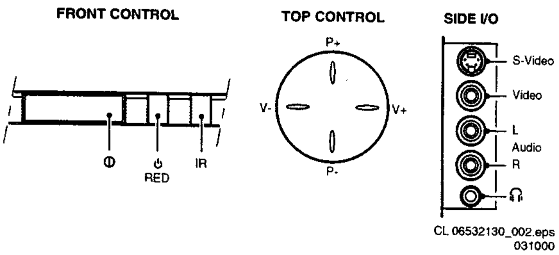

FRONT CONTROL
TOP CONTROL
SIDE I/O
P+
V-
V+
P-
RED
IR
S-Video
Video
L
Audio
R
CL 06532130_002.eps
031000

Figure 1-1 Front and Top Control, Side I/O connections

Hosiden: SVHS - In

1	-Y	Ground	⏚
2	-C	Ground	⏚
3	-Y	1 Vpp / 75 ohm	→○
4	-C	0.3 Vpp / 75 ohm	→○

Cinch: In

-CVBS	1 Vpp / 75 ohm	→○◎
-Audio - L	0.5 Vrms / 10 kohm	→○◎
-Audio - R	0.5 Vrms / 10 kohm	→○◎

Mini Jack: Headphone - Out

-Headphone	32 - 600 ohm / 10 mW	◎/🎧

1.2.2 Rear Connections

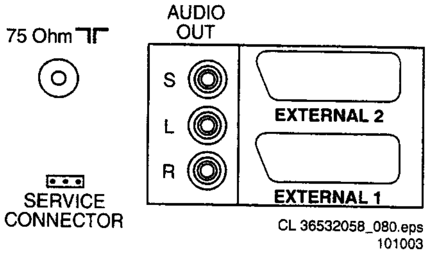

75 Ohm
AUDIO OUT
S
L
R
EXTERNAL 2
EXTERNAL 1
SERVICE CONNECTOR
CL 36532058_080.eps
101003

Figure 1-2 Rear connections

Aerial - In

-IEC-type	Coax, 75 ohm	⫟

Service connector

1	-SDA-S	I2C data (5 V)	→○○→
2	-SCL-S	I2C clock (5 V)	→○
3	-GND	Ground	⏚

Audio - Out (Cinch)

S	-Surround	0.5 Vrms / 1 kohm (optional)	○→◎
L	-Audio - L	0.5 Vrms / 1 kohm	○→◎
R	-Audio - R	0.5 Vrms / 1 kohm	○→◎

External 1: RGB/YUV and CVBS - In/Out

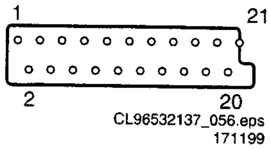
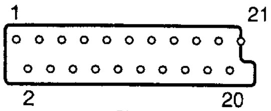

1
21
2
20
CL96532137_056.eps
171199

Figure 1-3 SCART connector

1	-Audio - R	0.5 Vrms / 1 kohm	○→
2	-Audio - R	0.5 Vrms / 10 kohm	→○
3	-Audio - L	0.5 Vrms / 1 kohm	○→
4	-Audio	Ground	⏚
5	-Audio	Ground	⏚
6	-Audio - L	0.5 Vrms / 10 kohm	→○
7	-Blue / U	0.7 Vpp / 75 ohm	→○
8	-CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	→○
9	-Video	Ground	⏚
10	-N.C.		
11	-Green / Y	0.7 Vpp / 75 ohm	→○
12	-N.C.		
13	-Video	Ground	⏚
14	-Video	Ground	⏚
15	-Red / V	0.7 Vpp / 75 ohm	→○
16	-Status / FBL	0 - 0.4 V: INT 1 - 3 V: EXT / 75 ohm	→○
17	-Video	Ground	⏚
18	-Video	Ground	⏚
19	-CVBS	1 Vpp / 75 ohm	○→
20	-CVBS	1 Vpp / 75 ohm	→○
21	-Shielding	Ground	⏚

External 2: CVBS and Y/C - In/Out (for recorder)

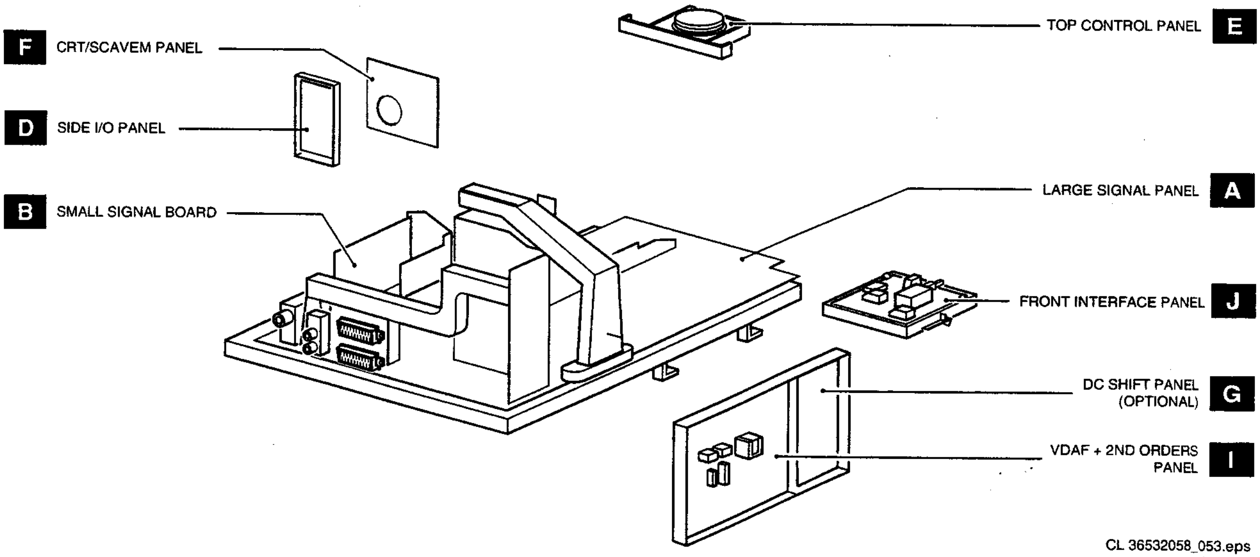


CL96532137_056.eps
171199

Figure 1-4 SCART connector

1	- Audio - R	0.5 Vrms / 1 kohm	⊖→
2	- Audio - R	0.5 Vrms / 10 kohm	→⊖
3	- Audio - L	0.5 Vrms / 1 kohm	⊖→
4	- Audio	Ground	⏚
5	- Audio	Ground	⏚
6	- Audio - L	0.5 Vrms / 10 kohm	→⊖
7	- C-in	0.7 Vpp / 75 ohm	⊖→
8	- CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	→⊖
9	- Video	Ground	⏚
10	- Easylink	(P50)	→⊖
11	- N.C.		
12	- N.C.		
13	- Video	Ground	⏚
14	- Video	Ground	⏚
15	- C	0.7 Vpp / 75 ohm	→⊖
16	- N.C.		
17	- Video	Ground	⏚
18	- Video	Ground	⏚
19	- CVBS-out	1 Vpp / 75 ohm	⊖→
20	- YCVBS-in	1 Vpp / 75 ohm	→⊖
21	- Shielding	Ground	⏚

1.3 Chassis Overview


F CRT/SCAVEM PANEL
D SIDE I/O PANEL
B SMALL SIGNAL BOARD
TOP CONTROL PANEL E
LARGE SIGNAL PANEL A
FRONT INTERFACE PANEL J
DC SHIFT PANEL (OPTIONAL) G
VDAF + 2ND ORDERS PANEL I

CL 36532058_053.eps
211103

Figure 1-5 PWB location

2. Safety and Maintenance Instructions, Warnings, and Notes

2.1 Safety Instructions

Safety regulations require that **during** a repair:

- Due to the chassis concept, a very large part of the circuitry (incl. deflection) is 'hot'. Therefore, connect the set to the mains via an isolation transformer.
- Replace safety components, indicated by the symbol ⚠, only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.
- Wear safety goggles when you replace the CRT.

Safety regulations require that **after** a repair, you must return the set in its original condition. Pay, in particular, attention to the following points:

- General repair instruction: as a strict precaution, we advise you to re-solder the solder connections through which the horizontal deflection current is flowing. In particular this is valid for the:
  1. Pins of the line output transformer (LOT).
  2. Fly-back capacitor(s).
  3. S-correction capacitor(s).
  4. Line output transistor.
  5. Pins of the connector with wires to the deflection coil.
  6. Other components through which the deflection current flows.

Note: This re-soldering is advised to prevent bad connections due to metal fatigue in solder connections, and is therefore only necessary for television sets more than two years old.

- Check the insulation of the mains cord for external damage.
- Check the strain relief of the mains cord for proper function, to prevent the cord from touching the CRT, hot components, or heat sinks.
- Check the electrical DC resistance between the mains plug and the secondary side (only for sets that have an isolated power supply). Do this as follows:
  1. Unplug the mains cord and connect a wire between the two pins of the mains plug.
  2. Turn on the main power switch (keep the mains cord unplugged!).
  3. Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection of the set. The reading should be between 4.5 Mohm and 12 Mohm.
  4. Switch the TV 'off' and remove the wire between the two pins of the mains plug.
- Check the cabinet for defects, to prevent the possibility of the customer touching any internal parts.

2.2 Maintenance Instructions

We recommend a maintenance inspection carried out by qualified service personnel. The interval depends on the usage conditions:

- When a customer uses the set under normal circumstances, for example in a living room, the recommended interval is three to five years.
- When a customer uses the set in an environment with higher dust, grease, or moisture levels, for example in a kitchen, the recommended interval is one year.
- The maintenance inspection includes the following actions:
  1. Perform the 'general repair instruction' noted above.
  2. Clean the power supply and deflection circuitry on the chassis.
  3. Clean the picture tube panel and the neck of the picture tube.

2.3 Warnings

- In order to prevent damage to ICs and transistors, avoid all high voltage flashovers. In order to prevent damage to the picture tube, use the method shown in Fig. 2-1, to discharge the picture tube. Use a high voltage probe and a multi-meter (position V_dc). Discharge until the meter reading is 0 V (after approx. 30 s).

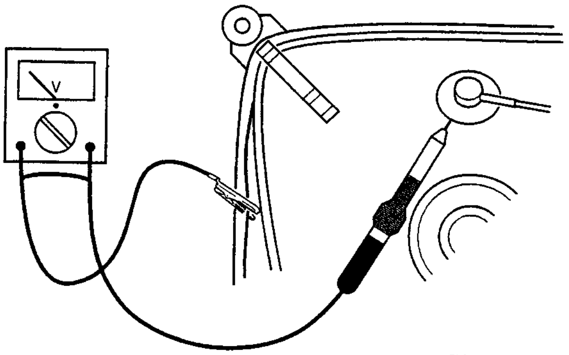


Figure 2-1 Discharge picture tube

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD, ⚠). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same potential as the mass of the set by a wristband with resistance. Keep components and tools also at this potential. Available ESD protection equipment:
  - Complete kit ESD3 (small tablemat, wristband, connection box, extension cable and ground cable) 4822 310 10671.
  - Wristband tester 4822 344 13999.
- Together with the deflection unit and any multi-pole unit, flat square picture tubes form an integrated unit. The deflection and the multi-pole units are set optimally at the factory. We do not recommend adjusting this unit during repair.
- Be careful during measurements in the high voltage section and on the picture tube.
- Never replace modules or other components while the unit is 'on'.
- When you align the set, use plastic rather than metal tools. This will prevent any short circuits and the danger of a circuit becoming unstable.

2.4 Notes

2.4.1 General

- Measure the voltages and waveforms with regard to the chassis (= tuner) ground ⏚), or hot ground (⏚), depending on the tested area of circuitry.
- The voltages and waveforms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 475.25 MHz (PAL) or 61.25 MHz (NTSC, channel 3).
- Where necessary, measure the waveforms and voltages with (⊓) and without (⊓̸) aerial signal. Measure the voltages in the power supply section both in normal operation (⏽) and in standby (⏻). These values are indicated by means of the appropriate symbols.

- The picture tube panel has printed spark gaps. Each spark gap is connected between an electrode of the picture tube and the Aquadag coating.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable per position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.
- Manufactured under license from Dolby Laboratories. 'Dolby', 'Pro Logic' and the 'double-D symbol', are trademarks of Dolby Laboratories.

DOLBY SURROUND
PRO • LOGIC

Figure 2-2 Dolby PL Symbol

2.4.2 Schematic Notes

- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kohm).
- Resistor values with no multiplier may be indicated with either an "E" or an "R" (e.g. 220E or 220R indicates 220 ohm).
- All capacitor values are expressed in micro-farads (μ= x 10^-6), nano-farads (n= x 10^-9), or pico-farads (p= x 10^-12).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An "asterisk" (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.4.3 Rework on BGA (Ball Grid Array) ICs

General
Although (LF)BGA assembly yields are very high, there may still be a requirement for component rework. By rework, we mean the process of removing the component from the PWB and replacing it with a new component. If an (LF)BGA is removed from a PWB, the solder balls of the component are deformed drastically so the removed (LF)BGA has to be discarded.

Device removal
As is the case with any component that, it is essential when removing an (LF)BGA, the board, tracks, solder lands, or surrounding components are not damaged. To remove an (LF)BGA, the board must be uniformly heated to a temperature close to the reflow soldering temperature. A uniform temperature reduces the chance of warping the PWB.
To do this, we recommend that the board is heated until it is certain that all the joints are molten. Then carefully pull the component off the board with a vacuum nozzle. For the appropriate temperature profiles, see the IC data sheet.

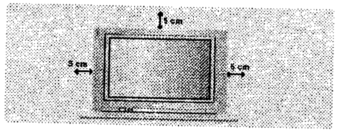
Area preparation
When the component has been removed, the vacant IC area must be cleaned before replacing the (LF)BGA.
Removing an IC often leaves varying amounts of solder on the mounting lands. This excessive solder can be removed with either a solder sucker or solder wick. The remaining flux can be removed with a brush and cleaning agent.
After the board is properly cleaned and inspected, apply flux on the solder lands and on the connection balls of the (LF)BGA.
Note: Do not apply solder paste, as this has shown to result in problems during re-soldering.

Device replacement
The last step in the repair process is to solder the new component on the board. Ideally, the (LF)BGA should be aligned under a microscope or magnifying glass. If this is not possible, try to align the (LF)BGA with any board markers.
To reflow the solder, apply a temperature profile according to the *IC data sheet*. So as not to damage neighbouring components, it may be necessary to reduce some temperatures and times

3. Directions for Use

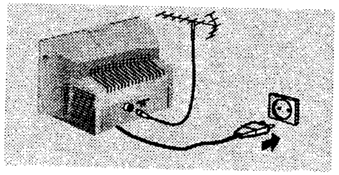
Installing your television set

❶ Positioning the television set



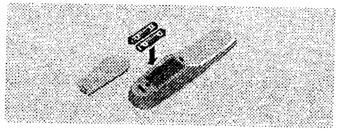
Place your TV on a solid, stable surface, leaving a space of at least 5 cm around the appliance. To avoid accidents, do not put anything on the set such as a cloth or cover, a container full of liquid (vase) or a heat source (lamp). The set must not be exposed to water.

❷ Connections



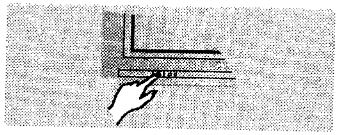
- Insert the aerial plug into the ┳ socket at the rear of the set.
  If you are using an indoor aerial, reception may be difficult in certain conditions. You can improve reception by rotating the aerial. If the reception remains poor, you will need to use an external aerial.
- Insert the mains plug into a wall socket (220-240V / 50 Hz).

❸ Remote control



Insert the two R6-type batteries (supplied) making sure that they are the right way round. Check that the mode selector is set to TV. The batteries supplied with this appliance do not contain mercury or nickel cadmium. If you have access to a recycling facility, please do not discard your used batteries (if in doubt, consult your dealer). When the batteries are replaced, use the same type.

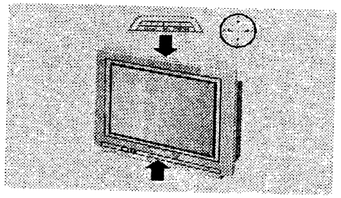
❹ Switching on



To switch on the set, press the on/off key. A red indicator comes on and the screen lights up. Go straight to the chapter Quick installation on page 4. If the television remains in standby mode, press **P** ⊕ on the remote control. The indicator will flash when you use the remote control.

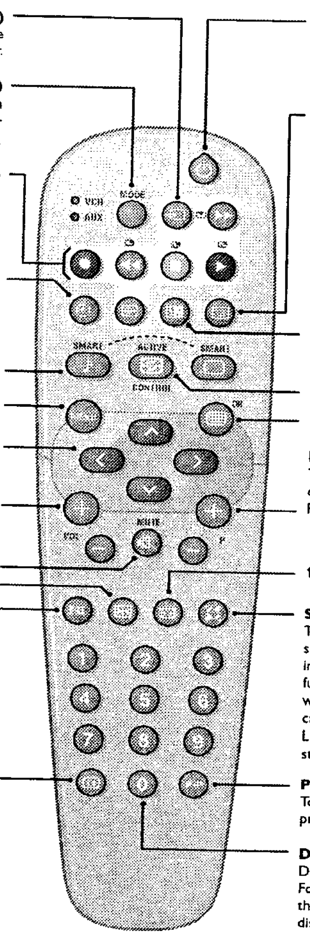
The keys on the TV set

The television set has 4 or 5 keys which are located on the front or the top of the set depending on the model. The VOLUME - + (- ◢ +) keys are used to adjust sound levels. The PROGRAM - + (- **P** +) keys are used to select the required programmes. To access the menus, simultaneously hold down the ◢ - and ◢ + keys (or MENU key). The PROGRAM - + keys may then be used to select an adjustment and the - ◢ + keys to make that adjustment. To exit from the menus, hold down the 2 ◢ - and ◢ + keys (or MENU key).



Note: when the **Child Lock** *function is activated, these keys are unavailable (refer to* **Features** *menu on page 7).*

Remote control keys



Select peripherals (p.10)
Press several times to select the required EXT connector.

Mode selector (p. 11)
To activate the remote control in TV, VCR (video recorder) or DVD mode.

Teletext keys (p. 8) or VCR / DVD (p.11)

Sleeptimer
To select the length of time before the set automatically switches to standby (from 0 to 240 minutes)

Smart picture and sound
Used to access a series of predefined picture and sound settings.
The **personal** *position relates to settings selected from the menus.*

Menu
To call up or exit the menus.

Cursor
These 4 keys are used to move around the menus.

Volume
To adjust the sound level

Mute
To mute or restore the sound.

Freeze the picture

Sound mode
Used to force programmes in **Stereo** and **Nicam Stereo** to **Mono** or, for bilingual programmes, to choose between **Dual I** or **Dual II**.
The **Mono** *indication is red when in forced position.*

Screen information
To display / remove the programme number, the name (if it exists), the time, the sound mode and the time remaining on the timer. Hold down for 5 seconds to permanently display the programme number on the screen. The volume level and the smart control adjustments are then displayed each time they are used.

Standby
To set the TV to standby mode. To switch the TV set on again, press ⓒ, P ⊖ ⊕ or ⓪ ⑨.

List of programmes
To display/clear the list of programmes. Use the keys ⌃⌄ to select a programme and the key ⟩ to display it.
The symbol 🔒 is displayed alongside all programmes which are locked (p.7).

Dual screen *(according to the version)*
To activate/disable the display on 2 screens. The second screen displays teletext.

Active Control *(according to the version)*
Optimizes the quality of the picture according to the quality of reception.

Teletext (p. 8)

Programme selection
To access the next or previous TV channel from the list of Favourite Programmes (see p. 5).

16:9 Format (p. 9)

Surround Sound
To activate / deactivate the surround sound effect. In stereo, this gives the impression that the speakers are further apart. For models equipped with Virtual Dolby Surround*, you can experience Dolby Surround Pro Logic sound effects. In mono, a stereo spatial effect is simulated.

Previous programme
To return to the previous programme.

Digit keys
Direct access to the programmes. For a 2 digit programme, enter the 2nd digit before the dash disappears.

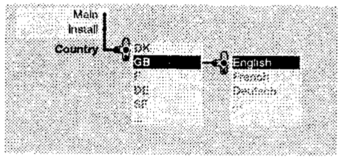
---

* *Manufactured under license from Dolby Laboratories. "Dolby" and the double-D symbols are trademarks of Dolby Laboratories.*

Plug & Play

Quick installation

When you turn on the TV set for the first time, a menu is displayed on screen.
This menu prompts you to select the country and language for the menus:



If the menu is not displayed, press and hold down the ◢- and ◢+ keys on the TV set for 5 seconds to display the menu.

❶ Use the ▲▼ keys on the remote control to select your country and validate with ▶.
If your country does not appear in the list, select choice ". . ."

❷ Next select your language using the ▲▼ keys and validate with ▶.

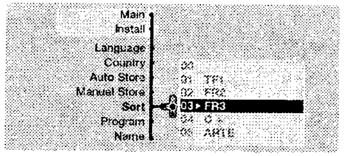
❸ The search starts automatically. All the available TV programmes will be stored.
This operation takes a few minutes.
The display shows the progress of the search and the number of programs found. At the end of the search, the menu disappears.
To exit or interrupt the search, press (MENU). If no programme is found, consult the possible solutions p. 12.

❹ If the transmitter or cable network sends the automatic sort signal, the programs will be numbered correctly. In this case, the installation is complete.

❺ If this is not the case, you need to use the **Sort** menu to number the programs correctly.
Some transmitters or cable networks broadcast their own sort parameters (region, language, etc.). In this case, indicate your choice using the ▲▼ keys and validate with ▶.

Program sort

❶ Press key (MENU). The **Main menu** is displayed on the screen.



❷ With the cursor, select the **Install** menu followed by the **Sort** menu.

❸ Select the programme you want to move using the ▲▼ keys and press ▶.

❹ Then use the ▲▼ keys to select the new number and validate with ◀.

❺ Repeat steps ❸ and ❹ for each program you wish to renumber.

❻ To quit the menus, press ⊜.

Program name

If required, you can give a name to the programmes and external connectors.
Note: on installation, the programs are named automatically when an identification signal is sent.

❶ Press the (MENU) key.

❷ With the cursor, select the **Install** menu, then **Name**

❸ Use the ⊖ **P** ⊕ keys to select the programme to name or rename.

❹ Use the ◀▶ keys to move around the name display area (5 characters) and the ▲▼ keys to select the characters.

❺ When the name has been entered, use the ◀ key to exit. The name is stored.

❻ Repeat steps ❸ to ❺ for each programme you wish to name.

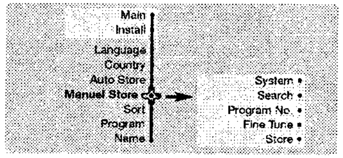
❼ To quit the menus, press ⊜.

Manual store

This menu is used to store the programmes one at a time.

❶ Press the (MENU) key.

❷ With the cursor, select the **Install** menu then **Manual store**:



❸ **System:** select **Europe** (automatic detection*) or **Western Europe** (BG standard), **Eastern Europe** (DK standard), **United Kingdom** (I standard) or **France** (LL' standard).

** Except for France (LL' standard), you must select choice* **France**.

❹ **Search:** press ▶. The search starts. Once a programme is found, the scanning stops and its name is displayed (when available). Go to the next step. If you know the frequency of the required programme, this can be entered directly using the ⓪ to ⑨ keys.
If no picture is found, consult the possible solutions (p. 12).

❺ **Program No.:** enter the required number with the ◀▶ or ⓪ to ⑨ keys.

❻ **Fine Tune:** if the reception is not satisfactory, adjust using the ◀▶ keys.

❼ **Store:** press ▶. The program is stored.

❽ Repeat steps ❹ to ❼ for each programme to store.

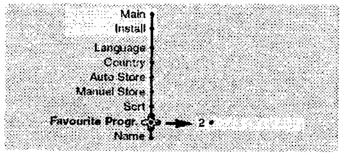
❾ To quit the menus, press ⊜.

Favourite programmes

This menu allows you to select the programmes to be accessed with the ⊖ **P** ⊕ key.

❶ Press the (MENU) key.

❷ With the cursor, select the **Install** menu then **Favourite Progr.** and press ▶.



The list of favourite programmes is displayed. The programmes that were stored at installation will automatically appear on this list.

❸ Use the up/downcursor to select the required programme.

❹ Use the left/right cursor to add or remove a programme from the list.

❺ Run through steps ❸ and ❹ for each programme to be added or removed from the list.

❻ To exit, press ⊜ several times.

Other settings in the Install menu

❶ Press the (MENU) key and select the **Install** menu:

❷ **Language:** to change the display language for the menus.

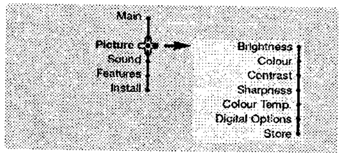
❸ **Country:** to select your country (**GB** for Great Britain).
This setting is used for the search, automatic programme sort and teletext display. If your country does not appear in the list, select ". . ."

❹ **Auto Store:** to start automatic search for all programmes available in your region. If the transmitter or cable network sends the automatic sort signal, the programmes will be numbered correctly. If this is not the case, you need to use the Sort menu to renumber the programmes (see p. 4).
Some transmitters or cable networks broadcast their own sort parameters (region, language, etc.). In this case, indicate your choice using the ▲▼ keys and validate with ▶. To quit or interrupt the search, press (MENU). If no picture is found, consult the possible solutions (p. 12).

❺ To quit the menus, press ⊜.

Picture settings

➊ Press (MENU) then ▶. The **Picture** menu is displayed:



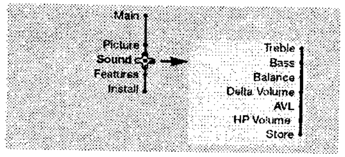
➋ Use the ▲▼ keys to select a setting and the ◀▶ keys to adjust.
Note: during the picture adjustment, only the selected line remains displayed. Press ▲▼ to display the menu again.

➌ Once the adjustments have been made, select **Store** and press ▶ to store them.
Press ⊡ to exit.

Description of the adjustments:
- **Brightness:** this changes picture brilliance.
- **Colour:** this changes the intensity of the colour.
- **Contrast:** this changes the difference between the light and dark tones.
- **Sharpness:** this changes the picture definition.
- **Colour Temp.:** this changes the colour rendering: **Cold** (bluer), **Normal** (balanced) or **Warm** (redder).
- **Digital Options:**
  - **100 Hz:** 100 Hz processing.
  - **Double lines:** doubling of vertical resolution which removes visible picture lines. *Advised for NTSC (60Hz) pictures.*
- **Store:** to store the picture adjustments and settings.

Sound adjustments

➊ Press (MENU), select Sound (▼) and press ▶. The **Sound** menu is displayed:



➋ Use the ▲▼ keys to select a setting and the ◀▶ keys to adjust.

➌ Once the adjustments have been made, select Store and press ▶ to store these changes.

➍ To quit the menus, press ⊡.

Description of the settings:
- **Treble**: this alters the high frequency sounds.
- **Bass:** this alters the low frequency sounds.
- Balance: this balances the sound on the left and right speakers.
- **Delta Volume** : this is used to compensate any volume discrepancies between the different programs or EXT sockets. This setting is available for programs 0 to 40 and the EXT sockets.
- **AVL** (Automatic Volume Leveller): this is used to limit increases in sound, especially on program change or advertising slots.
- **HP Volume** : allows you to adjust the headphones volume independently from the loud-speakers on the TV set.
- **Store:** this is used to store the sound settings.

Feature settings

➊ Press (MENU), select **Features** (▼) and press ▶. You can adjust:

➋ **Timer, Child Lock** and **Parental Cont.**: see next page

➌ **Dynamic NR: Min, Med** (optimum position), **Max** or **Off:** attenuates picture noise (snow) in difficult reception conditions.

➍ **Rotation** (only available on very large screen sets): large screen sets are sensitive to terrestrial magnetic field variations. This setting is used to compensate for this by adjusting the picture rotation.

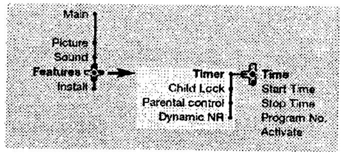
➎ To quit the menus, press ⊡.

Timer function

This menu lets you use the TV set as an alarm.

➊ Press the (MENU) key.

➋ With the cursor, select the **Features** menu then **Timer** :



➌ **Time:** enter the current time.
Note: the time is updated automatically each time the TV set is switched on via the teletext information on programme 1. If this program does not have teletext, the update will not take place.

➍ **Start Time:** enter the start time.

➎ **Stop Time:** enter the standby time.

➏ **Program No.:** enter the number of the programme for the wake-up alarm.

➐ **Activate:** the settings include:
- **Once** for a single alarm,
- **Daily** for each day,
- **Stop** to cancel.

➑ Press ⏻ to put the TV set in standby. It will automatically come on at the time programmed. If you leave the TV set on, it will just change programmes at the time entered (and will go to standby mode at the **Stop Time**).
*By combining the **TV lock** and **Timer** functions, you can restrict the period during which the TV set is used, for example by your children.*

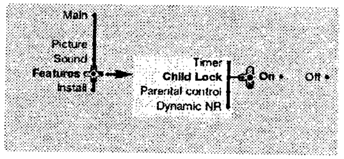
TV lock

You can block certain programs or inhibit use of the TV set completely by locking the keys.

Child lock

➊ Press (MENU).

➋ With the cursor, select the **Features** menu and position **Child Lock** to **On**.



➌ Turn off the TV set and hide the remote control. The TV set cannot be used (except via the remote control).

➍ To cancel: position **Child Lock** to **Off.**

Parental control

➊ Press the (MENU) key, select the **Features** menu then **Parental Cont.**:

➋ You must enter your secret access code. The first time you enter this, enter code 0711 twice and then enter your new code choice. The menu is displayed.

➌ **Parental Cont.**: Use the ▲▼ keys to select the TV programme required and validate with ▶. The 🔒 symbol will be displayed opposite the programmes or sockets that are locked. From now on, to view a locked programme, you must enter your secret code, otherwise the screen will stay blank.
*The access to the **Install** menu is also locked.*
Caution, for encrypted programs using an external decoder, you must lock the corresponding EXT socket.

➍ **Change code:** this allows you to enter a new 4 digit code. Confirm your new code by entering it a second time.
If you have forgotten your secret code, enter the universal code 0711 twice.

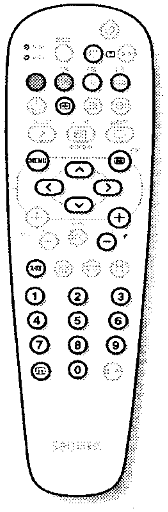
➎ **Unlock all:** this is used to unlock all locked programmes.

➏ **Lock All:** this is used to lock all the TV programmes and EXT connectors.

➐ Press the ⊡ key to quit.

Teletext

Teletext is an information system broadcast by certain channels which can be consulted like a newspaper. It also offers access to subtitles for viewers with hearing problems or who are not familiar with the transmission language (cable networks, satellite channels, etc.).



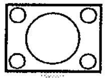
Press :		You will obtain:
⊜	**Teletext call**	This is used to call teletext, change to transparent mode and then exit. The summary appears with a list of items that can be accessed. Each item has a corresponding 3 digit page number. *If the channel selected does not broadcast teletext, the indication 100 will be displayed and the screen will remain blank (in this case, exit teletext and select another channel).*
⓪/⑨ ⊖P⊕ (⌃) (⌄)	**Selecting a page**	Enter the number of the page required using the ⓪ to ⑨ or ⊖ P ⊕ keys, (⌃)(⌄). Example: page 120, enter ① ② ⓪. The number is displayed top left, the counter turns and then the page is displayed. Repeat this operation to view another page. *If the counter continues to search, this means that the page is not transmitted. Select another number.*
●●○●	**Direct access to the items**	Coloured areas are displayed at the bottom of the screen. The 4 coloured keys are used to access the items or corresponding pages. *The coloured areas flash when the item or the page is not yet available.*
⊜	**Contents**	This returns you to the contents page (usually page 100).
(<) (>)	**Direct selection of sub-pages**	Certain pages contain sub-pages (for example, page 120 contains sub-pages 1/3, 2/3 and 3/3). If this is the case, the page number is displayed in green, preceded by the symbol ▶, ◀ or ◀ ▶. Use the keys (<)(>) to directly access the sub-pages of your choice.
⊜	**Enlarge a page**	This allows you to display the top or bottom part of the page and then return to normal size.
(I-II)	**Double page teletext** *(only available on certain versions)*	To activate or deactivate the double page teletext display mode. The active page is displayed on the left and the following page is displayed on the right. Press if you want to hold a page (i.e. the contents page). The active page is then displayed on the right. To return to normal mode, press (I-II).
⊜	**Hidden information**	To display or hide the concealed information (games solutions).
(MENU) ⊜ ●●○●	**Favourite pages**	Instead of the standard coloured areas displayed at the bottom of the screen, you can store 4 favourite pages on the first 40 channels which can then be accessed using the coloured keys (red, green, yellow, blue). Once set, these favourite pages will become the default every time tetetext is selected. ❶ Press the (MENU) key to change to favourite pages mode. ❷ Display the teletext page that you want to store. ❸ Press the coloured key of your choice for 3 seconds. The page is now stored. ❹ Repeat the operation with the other coloured keys. ❺ Now when you consult teletext, your favourite pages will appear in colour at the bottom of the screen. To temporaly retrieve the standard items, press (MENU). *To clear everything, and return the standard items as the default, press ⊜ for 5 seconds.*

16:9 Formats

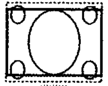
The pictures you receive may be transmitted in 16:9 format (wide screen) or 4:3 format (conventional screen). 4:3 pictures sometimes have a black band at the top and bottom of the screen (letterbox format). This function allows you to optimise the picture display on screen.

If your television is equipped with a 4:3 screen.

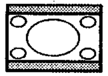
Press the ⊜ key (or (⌃)(⌄)) to select the different modes:



4:3
The picture is reproduced in 4:3 format.



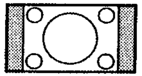
Expand 4:3
The picture is enlarged vertically. This mode is used to cancell the black bands when watching a programme in letterbox format.



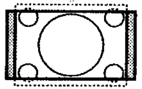
Compress 16:9
The picture is compressed vertically into 16:9 format.

If your television is equipped with a 16:9 screen.

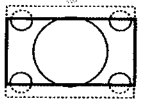
Press the ⊜ key (or (<)(>)) to select the different modes:
This TV set is also equipped with automatic switching which will select the correct-screen format, provided the specific signals are transmitted with the programmes.



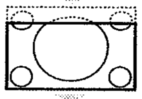
4:3
The picture is reproduced in 4:3 format and a black band is displayed on either side of the picture. The picture may be progressively enlarged using the (⌃)(⌄) keys.



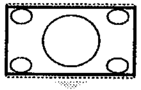
Zoom 14:9
The picture is enlarged to 14:9 format, a thin black band remains on both sides of the picture. The (⌃)(⌄) keys allow you to compress and move the image vertically to view the top or bottom of the picture (subtitles).



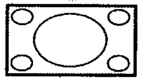
Zoom 16:9
The picture is enlarged to 16:9 format. This mode is recommended when displaying pictures which have black bands at the top and bottom (letterbox format).
Use the (⌃)(⌄) keys if you wish to compress and move the image vertically to view the top or bottom of the picture.



Subtitle Zoom
This mode is used to display 4:3 pictures using the full surface of the screen leaving the sub-titles visible.
Use the (⌃)(⌄) keys to increase or decrease the compression at the bottom of the screen.



Super Wide
This mode is used to display 4:3 pictures using the full surface of the screen by enlarging the sides of the picture. The (⌃)(⌄) keys allow you to scroll the image up or down the screen.

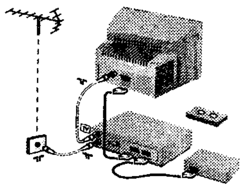


Widescreen
This mode restores the correct proportions of pictures transmitted in 16:9 using full screen display.

Connecting peripheral equipment

The television has 2 external sockets situated at the back of the set (EXT1 and EXT2).
The EXT1 socket has audio, CVBS/RGB inputs and audio, CVBS outputs.
The EXT2 socket has audio, CVBS/S-VHS inputs and audio, CVBS outputs.

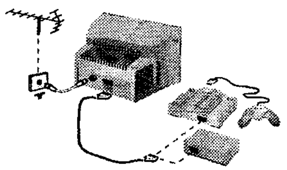
Video recorder



Carry out the connections shown opposite, using a good quality euroconnector cable.
If your video recorder does not have a euroconnector socket, the only connection possible is via the aerial cable. You will therefore need to tune in your video recorder's test signal and assign it programme number 0 (refer to manual store, p. 5).
To reproduce the video recorder picture, press ⓪.

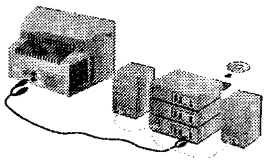
Video recorder with decoder
Connect the decoder to the second euroconnector socket of the video recorder. You will then be able to record scrambled transmissions.

Other equipment

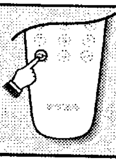


Satellite receiver, decoder, CDV, games, etc.
Carry out the connections shown opposite.
To optimise picture quality, connect the equipment which produces the RGB signals (digital decoder, games, etc.) to EXT1, and the equipment which produces the S-VHS signals (S-VHS and Hi-8 video recorders, certain DVD drives) to EXT2 and all other equipment to either EXT1 or EXT2.

Amplifier *(only available on certain versions)*

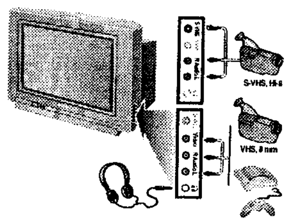


To connect to a hi-fi system, use an audio connection cable and connect the "L" and "R" outputs on the TV set to the "AUDIO IN" "L" and "R" input on your hi-fi amplifier.



To select connected equipment
Press the ⊕ key to select **EXT1, EXT2, S-VHS2** (S-VHS signals from the EXT2 socket) and **EXT3** for connections on the front panel.
Most equipment (decoder, video recorder) carries out the switching itself.

Side connections

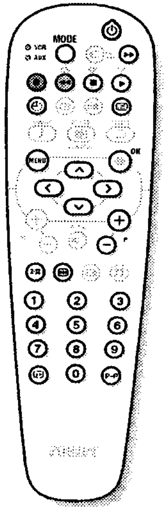


Make the connections as shown opposite.
With the ⊕ key, select **EXT3**.
For a monophonic device, connect the audio signal to the AUDIO L input. Use the Ⓘ-Ⓘ key to reproduce the sound on the left and right speakers of the TV set.

Headphones
Press the ⊗ key to mute the sound on the TV set (see also sound settings, page 6).
The headphone impedance must be between 32 and 600 Ohms.

Video recorder or DVD keys

The remote control lets you control the main functions of the VCR or DVD.



Press the **MODE** key to select the required mode : **VCR** (video recorder) or **AUX (DVD)**. The remote control indicator lights up to display the selected mode. It switches off automatically after 20 seconds if left idle.
The remote control automatically returns to TV mode.
The following keys are operational, depending on the equipment :

⏻	standby,
◀◀	fast rewind,
▶▶	fast forward,
●	recording,
■	stop,
▶	play,
⏲	VCR timer,
⊟	DVD : subtitling language
MENU	menu,
cursor	navigation and adjustments,
OK	validation,
⓪⑨	digit keys,
⊖ P ⊕	programme selection,
I-II	audio selection.
	pause,
ⓘ	OSD menu,
P•P	DVD :T-C function / VCR : index function.

The remote control is compatible with all video recorders using the RC5 standard and all DVDs using the RC6 standard.

Tips

Poor reception
The proximity of mountains or high buildings may be responsible for ghost pictures, echoing or shadows. In this case, try manually adjusting your picture: see **Fine Tuning** (p.5) or modify the orientation of the outside aerial.
Does your antenna enable you to receive broadcasts in this frequency range (UHF or VHF band)?
In the event of difficult reception (snowy picture) switch the **Dynamic NR** on the **Features** menu to **ON**. (p. 6).

No picture
If the television does not switch on, please press the standby key ⏻ (located on the remote control) twice.
Have you connected the aerial socket properly?
Have you chosen the right system? (p. 5).
Poorly connected euroconnector cables or aerial sockets are often the cause of picture or sound problems (sometimes the connectors can become half disconnected if the TV set is moved or turned). Check all connections.

Peripheral equipment gives a black and white picture
To play a video cassette, check that it has been recorded under the same standard (PAL, SECAM, NTSC) which can be replayed by the video recorder.

The remote control no longer works.
Check that the mode selector on the side of the remote control is set to TV.

No sound
If on certain channels you receive a picture but no sound, this means that you do not have the correct TV system. Modify the **System** setting (p. 5).

Teletext
Are certain characters not displayed correctly? Check that the **Country** setting has been positioned correctly (p.5).

Remote control
The TV set does not react to the remote control; the indicator on the set no longer flashes when you use the remote control? Replace the batteries.

Standby
When you switch the TV set on it remains in standby mode and the indication **Locked** is displayed when you use the keys on the TV set?
The **Child Lock** function is switched **On** (p. 7).
If the set receives no signal for 15 mins, it automatically goes into standby mode.
To save power, your set is fitted with components that give it a very low power consumption when in standby mode (less than 1 W).

Still no results?
If your TV set breaks down, never attempt to repair it yourself: contact your dealer's after-sales service.

Cleaning the set
Only use a clean, soft and lint-free cloth to clean the screen and the casing of your set. Do not use alcohol-based or solvent-based products.

Glossary

RGB Signals: These are 3 Red, Green and Blue video signals which directly drive the red, green and blue emitters in the cathode ray tube. Using these signals provides better picture quality.

NICAM sound: Process by which digital sound can be transmitted.

System: Television pictures are not broadcast in the same way in all countries. There are different standards: BG, DK, I, and L L'. The SYSTEM setting (p. 6) is used to select these different standards. This is not to be confused with PAL or SECAM colour coding. Pal is used in most countries in Europe, Secam in France, Russia and most African countries. The United States and Japan use a different system called NTSC.

16:9: Refers to the ration between the length and height of the screen.
Wide screen televisions have a ration of 16/9, conventional screen TV sets have a ration of 4/3.

Personal Notes:

4. Mechanical Instructions

Index of this chapter:

1. Service connector
2. Set Disassembly
3. Service Positions
4. Assy / Board Removal
5. Set Reassembly

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Service Connector (for ComPair)

For service diagnostics with ComPair, it is not necessary to disassemble the set. You only have to connect the ComPair interface box, via the appropriate cable, to the service connector (on the rear of the set, see figure 1-2), and start the program (see also chapter 5 "Service Modes, Error Codes, and Fault Finding ").

4.2 Set Disassembly

Follow the disassemble instructions in described order.

4.2.1 Rear Cover Removal

Warning: disconnect the mains power cord before you remove the rear cover.

1. Remove all the fixation screws of the rear cover.
2. Now the rear cover can be removed.

4.3 Service Positions

This chassis has several predefined service positions, for better accessibility. They are explained below in more detail.

4.3.1 Large Signal Panel (LSP)

Component Side LSP

For better accessibility of the LSP, do the following (see Figure "Service position 1"):

1. Remove the LSP-bracket from the bottom tray by pulling it backwards.
2. Hook the bracket in the first row of fixation holes of the bottom tray. In other words, reposition the bracket from [1] to [2].

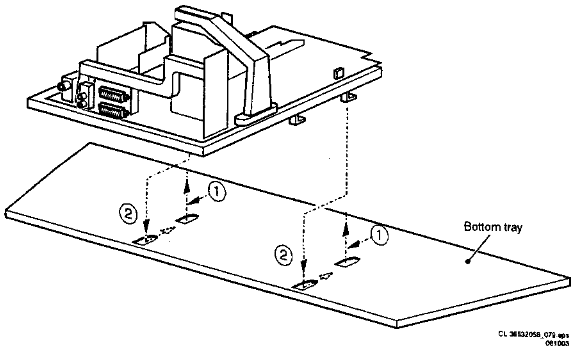


Figure 4-1 Service position 1

Solder Side LSP

To get access to the bottom side (solder side) of the LSP, do the following (see figure 4-1):

1. Remove the DAF-module (see paragraph "DAF Assy/ Panel" below).
2. Remove the Mains Switch-module (see paragraph "Mains Switch Assy/Panel" below).
3. Remove the cable from the side I/O panel.
4. Release some wiring from their fixation clamps, in order to get room for repositioning the LSP.
5. Flip the LSP 90 degrees clockwise [2], and place it in the fixation hole at the left side of the bottom tray [3].
6. Pull the LSP forward to fix it.

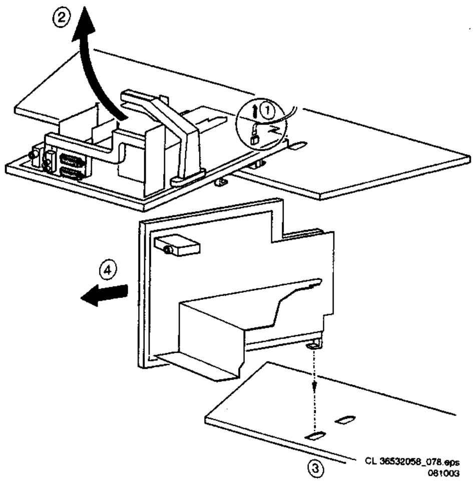


Figure 4-2 Service position 2

4.3.2 Small Signal Board (SSB)

In fact, there is no predefined service position for the SSB. Most test points are located on the A-side (side that is facing the tuner). If you have to replace ICs, you must take the complete SSB module out of the SIMM-connector.

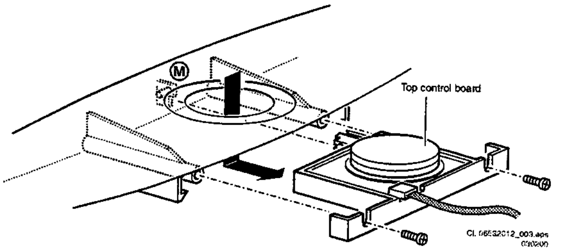
Notes:

- For better access to the SSB, it is possible to order an "extension tool" with cables. You can use this service extension tool to connect a Small Signal Board (SSB) of an a02, A10, or EMG (EMx) chassis, via two "IDE" cables to the SIMM connector in the set. In this way, you can service the SSB more easily outside the TV set. You can order this tool under 12nc: 9965 000 14526.
- If necessary for the measurement, you can put the LSP in "service position 2" (as described above).

4.4 Assy / Board Removal

Sometimes, it can be necessary to swap a complete assy or Printed Wiring Board (PWB). How that can be done is explained below.

4.4.1 Top Control Assy/Panel

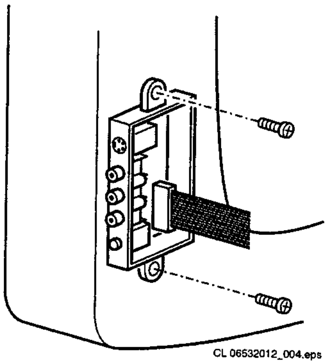


CL 06532012_003.eps
030200

Figure 4-3 Top control panel

1. Remove the two fixation screws, which hold the panel.
2. Pull the board backward (w.o.w. release it from the front hinge).
3. The board can easily be lifted out of the bracket after releasing the two fixation clamps at the connector side.

4.4.2 Side I/O Assy and Panel



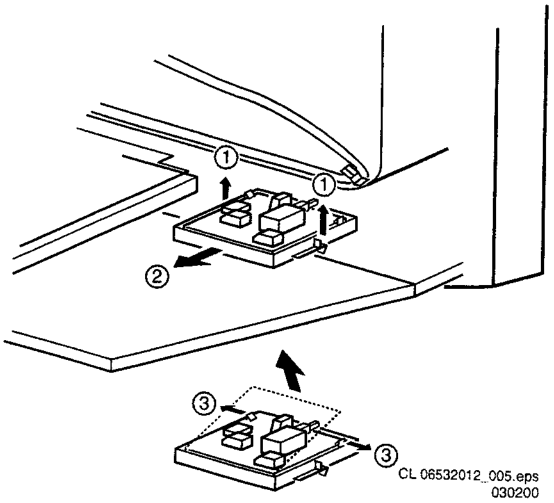
CL 06532012_004.eps
030200

Figure 4-4 Side-I/O panel

1. The complete Side I/O-assembly can easily be removed by unscrewing the two fixation screws.
2. The board can easily be lifted out of the bracket after releasing the two fixation clamps.

4.4.3 Mains Switch Assy/Panel

4.4.4 Accessing the Mains Switch/LED panel

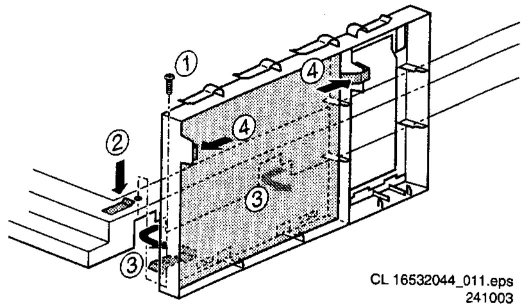


CL 06532012_005.eps
030200

Figure 4-5 Mains Switch/LED panel

1. Release the two fixation clamps (1) by pushing them upward.
2. At the same time, the complete assy must be pulled backward (2).
3. If the board has to be removed, release the two clamps at the sides of the bracket and lift panel out (3).

4.4.5 DAF Assy/Panel

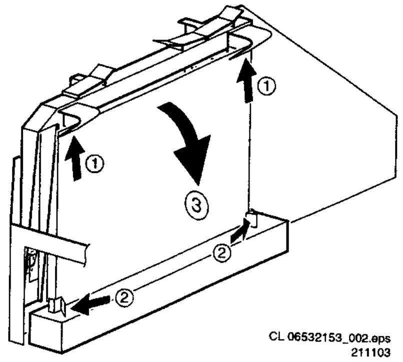


CL 16532044_011.eps
241003

Figure 4-6 DAF-module

1. Remove the fixation screw [1] (if present).
2. Push down the fixation clamp [2], and pull the complete bracket at the same time away from the CRT [3]. The module is now free from the LSP-bracket.

4.4.6 Small Signal Board (SSB)



CL 06532153_002.eps
211103

Figure 4-7 SSB removal

1. Push the top of the SSB towards the LOT [1].
2. Due to the pressure, the two metal clamps at both sides of the SIMM-connector will release [2].
3. Take the complete SSB out [3].

4.4.7 Large Signal Panel (LSP)

1. Remove the SSB (see paragraph "Small Signal Board (SSB)" above).
2. Disconnect the necessary cables.
3. Remove the fixation screw, which is located nearby the SIMM-connector.
4. Release the fixation clamps on the left of the LSP-bracket (the board hinges at the right side).
5. Remove the board from the bracket.

4.5 Set Re-assembly

To re-assemble the whole set, do all processes in reverse order.
Be sure that, before the rear cover is mounted:

- The mains cord is mounted correctly in its guiding brackets.
- All wires/cables are returned in their original positions. This is very important due to the large "hot" area of the set

5. Service Modes, Error Codes, and Fault Finding

Index of this chapter:

1. Test points
2. Service Modes
3. Problems and solving tips (related to CSM)
4. ComPair
5. Error Codes
6. The blinking LED procedure
7. Protections
8. Repair tips
9. Software downloading

5.1 Test Points

See chapter 6 " Block Diagrams, Testpoint Overview, and Waveforms".

Perform measurements under the following conditions:

- Service Default Mode.
- Video: colour bar signal.
- Audio: 3 kHz left, 1 kHz right.

5.2 Service Modes

Service Default Mode (SDM) and Service Alignment Mode (SAM) offer several features for the service technician, while the Customer Service Mode (CSM) is used for communication between a Philips Customer Care Centre (P3C) and a customer.

There is also the option of using ComPair, a hardware interface between a computer (see requirements below) and the TV chassis. It offers the ability of structured troubleshooting, test pattern generation, error code reading, software version readout, and software upgrading.
Minimum requirements: a Pentium processor, Windows 95/98, and a CD-ROM drive (see also paragraph "ComPair").

5.2.1 Service Default Mode (SDM)

Purpose

- To create a pre-defined setting, to get the same measurement results as given in this manual.
- To override SW protections (only when SDM is activated via shorting the SDM pins on the SSB).
- To start the blinking LED procedure.
- Inspection of error buffer, life timer, and software version.

Specifications

- Tuning frequency: 475.25 MHz for PAL/SECAM.
- Colour system: SECAM L for France or PAL B/G for the rest of Europe.
- All picture settings at 50 % (brightness, colour, contrast).
- All sound settings at 50 %, except volume at 25 %.
- All service-unfriendly modes (if present) are disabled, like:
  - (Sleep) timer.
  - Child/parental lock.
  - Blue mute.
  - Automatic volume limiter (AVL).
  - Auto switch-off (when no video signal was received for 10 minutes).
  - Skip/blank of non-favourite pre-sets.
  - Hotel or hospital mode.
  - Local keyboard block.
  - Smart modes.
  - Auto store of personal presets.
  - Auto user menu time-out.

How to Activate SDM

Use one of the following methods:

- Use the standard RC-transmitter and key in the code "062596", directly followed by the "MENU" button.
  Note: It is possible that, together with the SDM, the main menu will appear. To switch it "off", push the "MENU" button again.
- Short circuit, during switch "on" of the set, the two solder pads on the SSB with the indication "FOR SERVICE". These solder pads are located at the "tuner" side of the SSB (just above the large BGA IC).
  Caution: If the SDM is activated via these pins, all the software-controlled protections are de-activated for 15 s. When these 15 s are expired, the set will shutdown to protection mode.
- Use the DST-emulation feature of ComPair.
- Use the "DEFAULT" button on the Dealer Service Tool (RC7150).

After activating this mode:

- "SDM" will appear in the upper right corner of the screen.
- Also, the error buffer, operating hours, and software version are displayed (can be toggled "on/off" with the "STATUS / OSD / [i+]" button).
- Blinking LED procedure will be started.
- All software-controlled protections are overridden for 15 s. When these 15 s are expired, the set will shutdown to protection mode.

Contents of SDM:

- **HRS.** Displays the accumulated total of operation hours (not the standby hours) in hexadecimal value.
- **SW.** Displays the date of the software and the software version of the ROM
  example: A02EB1_1.00 = AAABBC-X.YY.
  - **AAA**= chassis name.
  - **BB**= region and/or function name: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM, B= Basic, T= Top, P= PAL, N= NTSC, S= Stereo, M= Mono.
  - **C**= the language cluster number.
  - **X.Y**= the software version, where X is the main version number (different numbers are not compatible with one another) and Y is the sub version number (a higher number is always compatible with a lower number).
- **ERR** (followed by maximal 8 errors). The most recent error is displayed at the upper left (for an error explanation see paragraph "Error Codes").

How to navigate

- When you press the "MENU" button on the RC transmitter, the set will toggle between the SDM and the normal user menu (with the SDM mode still active in the background).
- When you press the "STATUS / OSD / [i+]" button on the RC transmitter, the set will toggle only display "SDM". This mode is useful when performing measurements, then the OSD info will not generate interference.

How to exit SDM

Use one of the following methods:

- Switch the set to STANDBY via a standard customer RC-transmitter (the error buffer is erased).
- Via a standard customer RC-transmitter: key in "00"-sequence (the error buffer is **not** erased).

5.2.2 Service Alignment Mode (SAM)

Purpose

- To perform alignments.
- To change option settings.
- To easily identify the used software version.
- To view operation hours.
- To display / clear the error code buffer.

Specifications

- Operating hours counter.
- Software version.
- Option settings.
- Error buffer reading and erasing.
- Software alignments.
- Disable service unfriendly modes.

How to activate SAM

Use one of the following methods:

- Via a standard RC transmitter: key in the code “062596” directly followed by the “STATUS / OSD / [i+]” button.
- Use the DST-emulation feature of ComPair.
- Press the "ALIGN" button on the DST while the set is in the normal operation

After activating this mode, “SAM” will appear in the upper right corner of the screen.

Contents of SAM:

- **HRS.** Displays the accumulated total of operation hours (not the standby hours) in hexadecimal value
  Note: every time the set is switched "on" by the mains switch or the RC, the timer is increased by 0.5.
- **SW.** Displays the software version of the ROM
  example: A02EB1_1.00 = AAABBC-X.YY.
  - **AAA**= chassis name.
  - **BB**= region and/or function name: E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM, B= Basic, T= Top, P= PAL, N= NTSC, S= Stereo, M= Mono.
  - **C**= the language cluster number.
  - **X.Y**= the software version, where X is the main version number (different numbers are not compatible with one another) and Y is the sub version number (a higher number is always compatible with a lower number).
- **ERR** (followed by maximal 8 errors). The most recent error is displayed at the upper left (for an error explanation see paragraph “Error Codes”).
- **CLEAR ERRORS.** When you press the “OK” button, the error buffer is reset.
- **OPTIONS.** Extra features for Service.
- **AKB.** Disable (off) or enable (on) the "black current loop" (AKB= Auto Kine Bias). For Vg2 alignment.
- **VSD.** Disable (off) or enable (on) the vertical deflection (VSD= Vertical Scan Disable).**Do not use** (will cause a protection). Is for future use.
- **TUNER.** This will activate the “TUNER” alignments sub-menu.
- **WHITE TONE.** This will activate the “WHITE TONE” alignments sub-menu.
- **GEOMETRY.** This will activate the “GEOMETRY” alignments sub-menu.
- **SOUND.** This will activate the “SOUND” alignments sub-menu.
- **SMART SETTINGS.** This will activate the “SMART SETTINGS” alignments sub-menu.
- **STORE.** This will save the new settings/alignments.
- **EEPROM TEST.** This will report if the SW checksum is OK. Convenient after SW upgrading.
- **VID RAM TEST.** This will check the continuity of the address bus and data bus of the Video RAM.
- **VG2.** This feature is not implemented yet. **Do not use.**

Note: Alignments are described in chapter 8 "Alignments".

How to navigate

- In SAM, you can select the menu items with the “CURSOR UP/DOWN” key on the RC-transmitter. The selected item will be highlighted. When not all menu items fit on the screen, move the “CURSOR UP/DOWN” key to display the next/previous menu items.
- With the “CURSOR LEFT/RIGHT” keys, it is possible to:
  - (De) activate the selected menu item.
  - Change the value of the selected menu item.
  - Activate the selected submenu.
- When you press the “MENU” button on the RC transmitter, the set will toggle between the SAM and the normal user menu (with the SAM mode still active in the background).

How to exit SAM

Use one of the following methods:

- Switch the set to STANDBY via the RC-transmitter (the error buffer is erased).
- Via a standard customer RC-transmitter: key in “00”-sequence (the error buffer is **not** erased).

5.2.3 Customer Service Mode (CSM)

Purpose

When a customer is having problems with his TV-set, he can call his dealer or the Philips helpdesk (P3C). The service technician can than ask the customer to activate the CSM, in order to identify the status of the set. Now, the service technician can judge the severity of the complaint. In many cases, he can advise the customer how to solve the problem, or he can decide if it is necessary to visit the customer.
The CSM is a **read only** mode; therefore, modifications in this mode are not possible.

How to activate CSM

Use one of the following methods:

- Press the “MUTE” button on the RC-transmitter **simultaneously** with any key on the TV for at least 4 seconds.
- Key in the code “123654” via the standard RC transmitter.

Notes:

- Activation of the CSM is only possible if there is no (user) menu on the screen!
- During CSM, sound volume is set to 25% of the scale, "Smart Sound" is set to "Theatre" mode, and "Smart Picture" is set to "Rich/Movies" mode temporarily to ensure a good picture and sound of the working set. After leaving CSM, the original settings are restored.

How to navigate

By means of the “CURSOR-DOWN/UP” knob on the RC-transmitter, you can navigate through the menus.

Contents of CSM

The following information is displayed on screen:

- Text “CSM” on the first line.
- Line number for every line (to make CSM language independent).
- Option code information.
- Configuration information.
- Service-unfriendly modes.

1. **28PW8609/12** (if present). Type/model number according to the Philips standard.
2. **SOFTWARE.** Software version AAABBC-X.YY.
3. **HOURS ON.** Operating hours (in hexadecimal).
4. **CODES.** Shows the contents of the error buffer (the word “error” may not be used on this screen, instead “codes” is used).
5. **OP.** Option code information.
6. **SYSTEM.** "XXXXXX" is the (colour) system that is set for this preset (this is not applicable to NAFTA and AP-NTSC models).
7. **NO SIGNAL.** No "ident" signal present (VID status bit in MPIF) on selected source.
8. **TIMER ON** (if present). Timer (in "FEATURE" menu) is activated.
9. **CHANNEL LOCKED** (if present). Child Lock is activated (i.e. when local keyboard is locked).
10. **NOT PREFERED** (if present). Current channel is defined as skipped or non-preferred.

11. **HOTELMODE ON/OFF** (if present). Shows if the HOTEL mode is activated (only for Europe and AP).
12. **SOURCE.** Selected source before entry of CSM; XXX (channel no.), external source name (i.e. AV1, CVI, EXT1, etc...).
13. **SOUND.** Selected SOUND mode; "XX"= MONO, NICAM, STEREO, L1 (Language 1), L2 (Language 2), SAP, VIRTUAL, or DIGITAL prior entry to CSM.
14. **VOLUME.** Volume level before entry of CSM (typ. 00..100).
15. **BALANCE.** Balance level before entry of CSM (typ. -50..50).
16. **BRIGHTNESS.** Brightness level before entry of CSM (typ. 00..100).
17. **COLOR.** Colour level before entry of CSM (typ. 00..100).
18. **CONTRAST.** Contrast level before entry of CSM (typ. 00..100).
19. **HUE** (if present). Hue level before entry of CSM (typ. -50..100).

How to exit CSM

Use one of the following methods:

- After you press a key on the RC-transmitter (with exception of the "CHANNEL", "VOLUME" and digit (0-9) keys), or
- After you switch the TV-set "OFF" with the mains switch.
- After 15 min. no RC or local keyboard actions.

5.3 Problems and Solving Tips (related to CSM)

Note: Below described problems are all related to the TV settings. The procedures to change the value (or status) of the different settings are described above. New value(s) are automatically stored.

5.3.1 Picture Problems

Picture too dark

1. Press SMART PICTURE on the RC. In case the picture improves, increase the "Brightness" or the "Contrast" value. The new value(s) are automatically stored (in "personal" pre-set) for all TV channels.
2. Check in CSM lines BRIGHTNESS and/or CONTRAST. If the value of line BRIGHTNESS is low (< 10) or the value of line CONTRAST is low (< 10), increase them.

Picture too bright

1. Press SMART PICTURE on the RC. In case the picture improves, decrease the "Brightness" or the "Contrast" value. The new value(s) are automatically stored (in "personal" pre-set) for all TV channels.
2. Check in CSM lines BRIGHTNESS and/or CONTRAST. If the value of line BRIGHTNESS is high (> 40) or the value of line CONTRAST is high (> 50), decrease the "Brightness" or the "Contrast" value.

White line around picture elements and text

1. Press SMART PICTURE on the RC. In case the picture improves, decrease the "Sharpness" value. The new value is automatically stored (in "personal" pre-set) for all TV channels.
2. Check in CSM line SHARPNESS. Decrease the "Sharpness" value. The new value is automatically stored for all TV channels.

No picture

Check in CSM line 7. In case this line shows NO SIGNAL, check the aerial cable/aerial system.

Blue picture

No proper signal is received. Check the aerial cable/aerial system.

Blue picture and/or unstable picture

A scrambled or decoded signal is received.

Black and white picture

Check in CSM line COLOR. In case the value is low (< 10), increase the "Color" value. The new value is automatically stored for all TV channels.

No colours/colour lines around picture elements or colours not correct or unstable picture

1. Check in CSM line SYSTEM. If a "strange" system pops up, something has gone wrong during installation. Re-install the channel.
2. In case line SYSTEM is "FRANCE", the installed system for this pre-set is SECAM, while PAL is required. Install the required program again: open the installation menu and perform manual installation. Select system "West Europe".

Menu text not sharp enough

1. Press "SMART PICTURE". In case picture improves, decrease the "Contrast" value. The new value(s) are automatically stored for all TV channels.
2. Check in CSM line CONTRAST. If the value of this line is high (> 50), decrease the "Contrast" value.

5.3.2 Sound Problems

No sound from left and right speaker

Check in CSM line VOLUME. If the value is high, increase the value of "Volume". The new value(s) are automatically stored (in "personal" pre-set) for all TV channels.

Sound too loud for left and right speaker

Check in CSM line VOLUME. If the value is low, decrease the value of "Volume". The new value(s) are automatically stored (in "personal" pre-set) for all TV channels.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development on the European DST (service remote control), which allows faster and more accurate diagnostics. ComPair has three big advantages:

- ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures.
- ComPair allows very detailed diagnostics (on I²C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I²C commands yourself because ComPair takes care of this.
- ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the SearchMan electronic manual of the defective chassis, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the (defective) product. The ComPair interface box is connected to the PC via a serial or RS232 cable.

For this chassis, the ComPair interface box and the TV communicate via a bi-directional service cable via the service connector.

The ComPair faultfinding program is able to determine the problem of the defective television. ComPair can gather diagnostic information in two ways:

- **Automatic** (by communication with the television): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the television. ComPair can send and receive I2C commands to the micro controller of the television. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the TV-set.
- **Manually** (by asking questions to you): Automatic diagnosis is only possible if the micro controller of the television is working correctly and only to a certain extends. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (e.g. Does the screen give a picture? Click on the correct answer: YES / NO) and showing you examples (e.g. Measure test-point I7 and click on the correct oscillogram you see on the oscilloscope). You can answer by clicking on a link (e.g. text or a waveform picture) that will bring you to the next step in the faultfinding process.

By a combination of automatic diagnostics and an interactive question / answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:

- Up- or downloading of pre-sets.
- Managing of pre-set lists.
- Emulation of the Dealer Service Tool (DST).
- If both ComPair and SearchMan (Electronic Service Manual) are installed, all the schematics and the PWBs of the set are available by clicking on the appropriate hyperlink.
  Example: *Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the Mono-carrier.*
  - Click on the “Panel” hyperlink to automatically show the PWB with a highlighted capacitor C2568.
  - Click on the “Schematic” hyperlink to automatically show the position of the highlighted capacitor.
- SW upgrading

5.4.3 Stepwise Start-up

This is realised via ComPair and is very helpful when a **protection** is activated (see also chapter “Protections”). Under normal circumstances, a fault in the power supply, or an error during start-up, will switch the television to protection mode. ComPair can take over the initialisation of the television. In this way, it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem. Take notice that the transition between two steps can take some time, so give the set some time to reach a stable state. During the transition time, the LED can blink strangely.

On activating Service mode, protections and other errors can be trapped by powering the TV in stepwise fashion as explained below. The "stepwise start-up" mode is done in the specified sequence. Before activating this mode, all the protections are disabled and are only enabled step-by-step, to trap the errors more appropriately.

The following steps are involved.

Step 0: Standby.

- Pre-condition: The set is in protection mode.
- Post-condition: The set is switched to the stepwise start-up mode. Only the necessary Standby Supply is present, all other supplies are switched "off".

Step 1: Power "on".

- Pre-condition: All protections are disabled, sound amplifiers are muted, and general initialisation is done.
- Post-condition: 8V and 5V supplies are "on". Degaussing is "on" and switched "off" after 3 s. The supply fault protections are enabled.

Step 2: Initialised.

- Pre-condition: Step 1 is done. No supply protection faults are detected.
- Post-condition: ADOC, MPIF, and Tuner components are initialised.

Step 3: Deflection "on".

- Pre-condition: Step 2 is done. No protection faults detected.
- Post-condition: Deflection is switched "on". The horizontal deflection fault protections are enabled.

Step 4: TV "on".

- Pre-condition: Step 3 is done. No protection faults detected.
- Post-condition: Picture tube is switched "on". Sound amplifiers are demuted. The X-ray/beam current fault protections are enabled.

Note: When the set is in stepwise mode and, due to stepping-up, a protection is activated, the set will really go into protection (blinking LED). The set will not leave the stepwise-mode however. If state X is the state where the set went to protection, stepwise start-up will return to state X-1. At state (X-1) diagnostic measurements can be performed. Also, in the short time, the set is in state X but not in protection, you can also do some measurements.

5.4.4 How To Connect

1. First, install the ComPair Browser software (see the Quick Reference Card for installation instructions).
2. Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked with “PC”) of the ComPair interface.
3. Connect the mains adapter to the supply connector (marked with “POWER 9V DC”) of the ComPair interface.
4. Switch the ComPair interface “OFF”.
5. Switch the television set “OFF” with the mains switch.
6. Connect the ComPair interface cable between the connector on the rear side of the ComPair interface (marked with “I2C”) and the ComPair connector at the rear side of the TV.
7. Plug the mains adapter in a mains outlet, and switch the interface “ON”. The green and red LEDs light up together. The red LED extinguishes after approx. 1 second while the green LED remains lit.
8. Start the ComPair program and read the “Introduction” chapter.

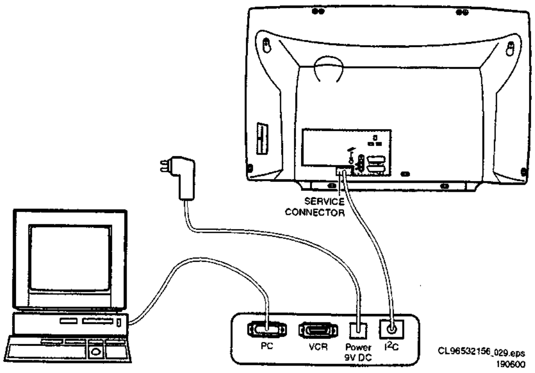


Figure 5-1 ComPair Interface connection

5.4.5 How To Order

ComPair order codes:

- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excluding transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (2003 update): 3122 785 60110.
- SearchMan32 CD (2003 update): 3122 785 60120.
- ComPair interface cable: 3122 785 90004.
- ComPair firmware upgrade IC: 3122 785 90510.
- Transformer Europe: 4822 727 21632.
- Transformer UK: 4822 727 21633.

5.5 Error Codes

5.5.1 Introduction

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right, new errors are logged at the left side, and all other errors shift one position to the right.
When an error has occurred, the error is added to the list of errors, provided the list is not full or the error is a protection error.
When an error occurs and the error buffer is full, then the new error is not added, and the error buffer stays intact (history is maintained), except when the error is a protection error.
To prevent that an occasional error stays in the list forever, the error is removed from the list after 50+ operation hours.
When multiple errors occur (errors occurred within a short time span), there is a high probability that there is some relation between them.

5.5.2 How to read the Error Buffer

Use one of the following methods:

- On screen via the SAM (only if you have a picture). Examples:
  - **0 0 0 0**: No errors detected
  - **6 0 0 0**: Error code 6 is the last and only detected error
  - **9 6 0 0**: Error code 6 was first detected and error code 9 is the last detected error
- Via the blinking LED procedure (when you have no picture). See next paragraph.
- Via ComPair.

5.5.3 How to clear the Error Buffer

Use **one** of the following methods:

- By activation of the "CLEAR ERRORS" command in the SAM menu.
- With a normal RC, key in sequence "MUTE" followed by "062599" and "OK".
- When you transmit the commands "DIAGNOSE" - "99" - "OK" with ComPair (or with a DST).
- If the content of the error buffer has not changed for 50+ hours, it resets automatically.

5.5.4 Error Codes

Error codes are required to indicate failures in the TV set. In principle a unique error is available for every:

- I2C device error.
- I2C bus error (for every bus containing two or more I2C devices).
- Protection error (e.g. +8V protection or Horizontal protection).
- Error not related to an I2C device, but of importance (e.g. BC-loop, RAM error).

Table 5-1 Error Table

Error	Description
0	No error
1	Horizontal Protection (via NOHFB bit in ADOC)
3	+8V error (missing/protection active by checking MPIF ASUP bit))
4	X-ray/High beam current protection signal (via XPROT bit in ADOC)
5	Hardware Protection is active (same as EMG)
7	Under-voltage protection
11	MPIF I2C communication failure / MPIF test failed
12	BC-loop not stabilised within the time limit (i.e. after timer is expired)
13	NVM I2C communication failure
14	Main tuner I2C failure UV13xx
17	3D Combfilter I2C communication failure
18	PIP Tuner I2C failure
19	2fH component input I2C failure (PCF8574)
21	PIP IF demodulator IC TDA988x communication failed (only for PIP/DW sets)
22	Flash over protection error (to register CRT flash-overs, via FPR bit in ADOC)

Service tips:

- In case of non-intermittent faults, clear the error buffer before you begin the repair. This to ensure that old error codes are no longer present. Before clearing the buffer, write down the content, as this history can give you significant information.
- If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause (e.g., a fault in the protection detection circuitry can also lead to a protection).

5.6 The Blinking LED Procedure

5.6.1 Introduction

Via this procedure, you can make the contents of the error buffer visible via the front LED. This is especially useful for fault finding, when there is no picture.

When the SDM is activated, the front LED will show (blink) the contents of the error-buffer. Error-codes > 10 are shown as follows:

1. A long blink of 750 ms (which is an indication of the decimal digit),
2. A pause of 1500 ms,
3. "n" short blinks (where "n" = 1 - 9),
4. When all the error-codes are displayed, the sequence finishes with a LED blink of 3000 ms,
5. The sequence starts again.

Example: Error 12 9 6 0 0.
After activation of the SDM, the front LED will show:

1. 1 long blink of 750 ms (which is an indication of the decimal digit) followed by a pause of 1500 ms,
2. 2 short blinks of 250 ms, followed by a pause of 3000 ms,
3. 9 short blinks of 250 ms, followed by a pause of 3000 ms,
4. 6 short blinks of 250 ms, followed by a pause of 3000 ms,
5. 1 long blink of 3000 ms to finish the sequence,
6. The sequence starts again.

5.6.2 How to activate

Use one of the following methods:

- Activate the SDM (only via soldering pads marked "FOR SERVICE" on the SSB). The blinking front LED will show the entire contents of the error buffer (this works in "normal operation" mode and in "protection" mode). In order to avoid confusion with RC5 signal reception blinking, this LED blinking procedure is terminated when an RC5 command is received.

- Transmit the commands "MUTE", "06250x", and "OK" with a normal RC (where "x" is the position in the error buffer that has to be displayed). With x= 1, the last detected error is shown, x= 2 the second last error, etc.... When x= 0, all errors are shown.
- "DIAGNOSE X" with the DST (where "x" is the position in the error buffer that has to be displayed). With x= 1, the last detected error is shown, x= 2 the second last error, etc.... When x= 0, all errors are shown.

Note: It can take some seconds before the blinking LED starts.

5.7 Protections

5.7.1 Introduction

Fault protections are introduced to avoid unacceptable temperature rising and burning hazards. If a fault situation is detected, an error code will be generated and if necessary, the set is put in protection mode.
The protection mode is indicated by the blinking of the front LED at a frequency of 3 Hz (or by a coded blinking in special cases). For the customer, it is made impossible to switch "on" the set during a protection.
It is possible to determine the type of fault by interpreting the blinking pattern of the LED indicator. It is also possible to read out the error codes from the NVM via ComPair. It is possible to de-activate the protection states in the Service Default Mode.

The following protections are implemented:

Table 5-2 Protections overview

Protection	Detection method	Bit name	Detection
Under Voltage	Via ADC (KB)	ADC (KB)	ADC input
+8V Supply	Via MPIF_IRQ	ASUP	MPIF internal register
Horizontal fly-back	Via interrupts	NOHFB	ADOC internal register (DOP)
X-ray	Via interrupts	XPROT	ADOC internal register (DOP)
Beam Current	Via interrupts	BCF	ADOC internal register (DOP)
Flash	Hardware ctrl	-	Hardware
Arc	Hardware ctrl	-	Hardware
Vertical	Hardware ctrl	-	Hardware
East/West	Hardware ctrl	-	Hardware
Bridge coil	Hardware ctrl	-	Hardware

The protections are split up in the following order:

- I2C related protections.
- ADOC related protections (via polling on I/O pins or via algorithms).
- DOP related protections (mainly for deflection items).
- Hardware errors that are not sensed by the OTC (e.g. vertical flyback protection, bridge coil protection, E/W protection, arcing protection).

All faults detected are re-checked five times before the protection mode is triggered. It should be noted that supply fault detection/protection are enabled only after the chassis power supply has been established. Likewise, after the line drive starts, the deflection detection/protection must be enabled. To prevent false activation of protection mode during power mode transitions, interrupts related to supply fault and deflection fault are disabled.

5.7.2 I2C Related Protections

In normal operation, some registers of the I2C controlled ICs are refreshed every 200 ms. During this sequence, the I2C busses and the I2C ICs are checked.
An I2C protection will take place if the SDA and SCL lines are short-circuited to ground, or to each other. An I2C error will also occur, if the power supply of the IC is missing.

5.7.3 ADOC Related Protections

If a protection is detected at an ADOC input, the uP will start to scan all protection inputs every 200 ms for five times. If the protection on one of the inputs is still active after 1 s, the microprocessor will put the set in the protection mode. Before the scanning is started, a so-called "ESD refresh" is carried out. This is done, because the interrupt on one of the inputs is possibly caused either by a flash or by ESD. As a flash or ESD can influence IC settings, the key ICs are initialised again, to ensure the normal picture and sound conditions of the set.

Under Voltage Protection
The under voltage protection is needed due to the non-isolated chassis architecture used in A02. Whenever there is a short circuit in the Deflection yoke coil or in the Audio power supply, the averaged Horizontal Flyback Voltage (HFB_XRAY_PROT) will fall. After signal conditioning, this voltage is fed to the "KEYBOARD_ADC" input. When this input of the MIPS controller is less than a certain level, the under voltage protection is activated. This is done by the normal keyboard polling mechanism.
The protection mode is activated after five consecutive occurrences. Response time required is 2 s. This is to avoid set going to under voltage protection mode during start up, since the HFB will only be stable w.r.t. mains on for about 1.6 s.

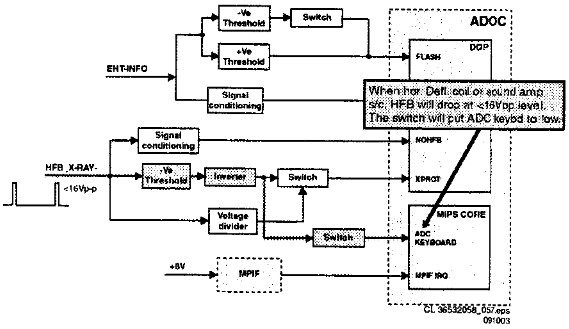
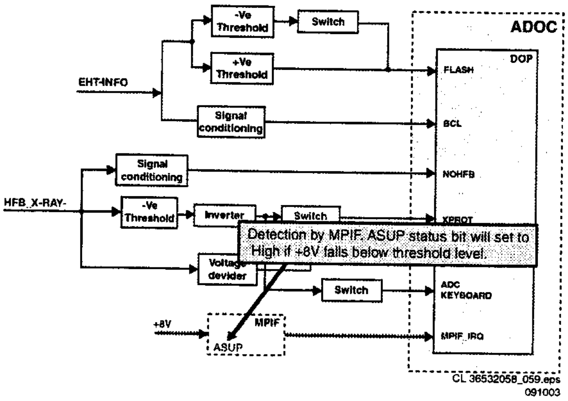


Figure 5-2 Under Voltage Protection

+8V Protection
Hardware is employed for the detection of +8V supply fault. A hardware interrupt (MPIF-IRQ) is generated by the MPIF when the +8V supply falls below the IC specification.
To avoid false detection, the corresponding interrupt sub routine checks the status of "ASUP" bit in the MPIF status register for five times consecutively with an interval of 200 ms before triggering the protection mode. Response time required is 1.2 s.


-Ve Threshold
Switch
ADOC
+Ve Threshold
DOP
EHT-INFO
FLASH
Signal conditioning
BCL
Signal conditioning
NOHFB
HFB_X-RAY-
-Ve Threshold
Inverter
Switch
XPROT
Voltage devider
Switch
ADC KEYBOARD
+8V
MPIF
ASUP
MPIF_IRQ
CL 36532058_059.eps
091003

Detection by MPIF. ASUP status bit will set to High if +8V falls below threshold level.

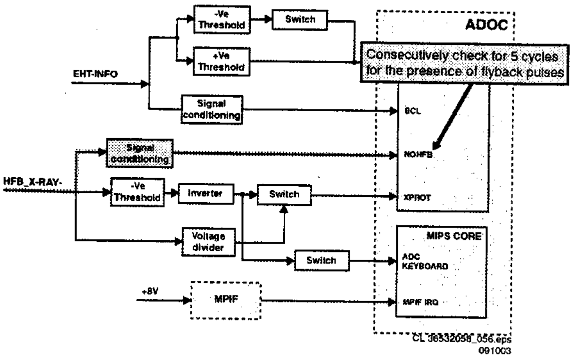
Figure 5-3 +8V Protection

5.7.4 DOP Related Protections

The uP reads every 200 ms the status register of the DOP (via the I2C bus). If a protection signal is detected on one of the inputs of the DOP, the relevant error bit in the register is set to "high". If this error bit is still "high" after 1 s, the OTC will store the error code in the error buffer of the NVM and, depending on the relevancy of the error bit, the set will either go into the protection mode or not.

Horizontal Fly Back Protection

Hardware is employed for the detection of a horizontal deflection fault. The DOP core generates a hardware interrupt when consecutive three horizontal flyback pulses are not received at the HFB input of the DOP block of the ADOC IC. To avoid false detection, the corresponding interrupt sub routine checks the status of "NOHFB" status bit in the DOP core for five times consecutively with an interval of 50 ms before triggering the protection mode. The response time for this protection needed is 300 ms.

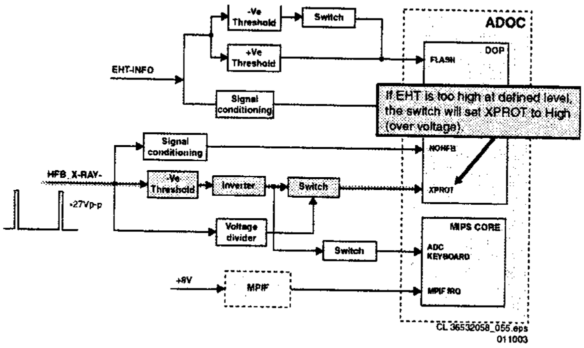

-Ve Threshold
Switch
ADOC
+Ve Threshold
EHT-INFO
Signal conditioning
BCL
Signal conditioning
NOHFB
HFB_X-RAY-
-Ve Threshold
Inverter
Switch
XPROT
Voltage divider
MIPS CORE
Switch
ADC KEYBOARD
+8V
MPIF
MPIF IRQ
CL 36532058_056.eps
091003

Consecutively check for 5 cycles for the presence of flyback pulses

Figure 5-4 Horizontal Fly Back Protection

X-Ray Protection (Over Voltage, USA only)

Hardware is employed for the detection of X-ray fault. A hardware interrupt is generated by the DOP core when the "XPROT" input of ADOC IC is pulled "HIGH" (flyback pulses are > 27 V_pp).
To avoid false detection, the corresponding interrupt sub routine checks the status of "XPROT" bit in DOP core for five times consecutively with an interval of 50 ms before triggering the protection mode. It should be noted that the "XPROT" status is not reset on reading. It should be cleared by the software explicitly.
Once the XRAY protection status is confirmed, the "PRD" bit has to be set to "1" by software. This enables an automatic stop of the H-out via Slow Stop initiated by auto-clearing the DFL bit. Now, the protection mode is activated.

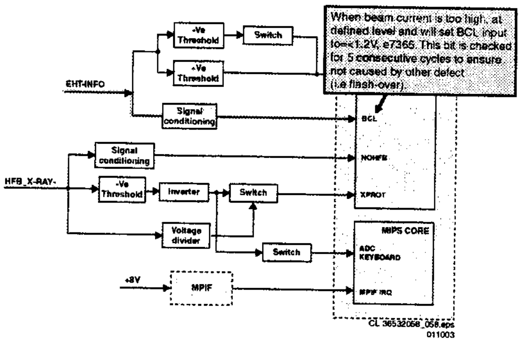

-Ve Threshold
Switch
ADOC
+Ve Threshold
DOP
EHT-INFO
FLASH
Signal conditioning
Signal conditioning
NOHFB
HFB_X-RAY-
-Ve Threshold
Inverter
Switch
XPROT
+27Vp-p
Voltage divider
MIPS CORE
Switch
ADC KEYBOARD
+8V
MPIF
MPIF IRQ
CL 36532058_055.eps
011003

If EHT is too high at defined level, the switch will set XPROT to High (over voltage).

Figure 5-5 X-Ray Protection

Beam Current Protection

A hardware interrupt is generated by the DOP core when the current at the BCL input of the ADOC IC exceeds the limit. To avoid false detection, the corresponding interrupt sub routine checks the status of "BCF" bit in DOP core for five times consecutively with an interval of 50 ms before triggering the protection mode. Once the BCL protection status is confirmed, the "PRD" bit has to be set to "1" by software. This enables an automatic stop of the H-out via Slow Stop initiated by auto-clearing the "DFL" bit. Now, the protection mode is activated.


-Ve Threshold
Switch
+Ve Threshold
EHT-INFO
Signal conditioning
BCL
Signal conditioning
NOHFB
HFB_X-RAY-
-Ve Threshold
Inverter
Switch
XPROT
Voltage divider
MIPS CORE
Switch
ADC KEYBOARD
+8V
MPIF
MPIF IRQ
CL 36532058_058.eps
011003

When beam current is too high, at defined level and will set BCL input to=<1.2V, e7365. This bit is checked for 5 consecutive cycles to ensure not caused by other defect (i.e flash-over).

Figure 5-6 Beam Current Protection

Flash Protection

Flash detection is used to shutdown the set only if the Flash occurs more than 5 times and is persistent. Therefore, this is a method to protect the set from undue electrical stress because of picture tube flashes. The flash detector circuitry uses the "EHT_INFO" signal as input. Its output is connected to the "FLASH" input of the DOP block of the ADOC.
When the "FLASH" input is pulled "HIGH", the ADOC's horizontal drive output stops immediately and the "FPR" status bit of the DOP core is set to "1". The status is latched until readout. With the absence of any other disturbances, the horizontal drive output will restart after the "FLASH" input is "LOW" again. No software interaction is required in this case. The "FPR" bit has to be readout by polling at an interval of 500 ms. If the "FPR" status bit has been set to "1" for more than 5 times consecutively, then the protection mode has to be triggered. Setting the "FPR" bit for less than 5 times by the "FLASH" input does not need to trigger the protection mode (shutting down of the H-drive should be enough).

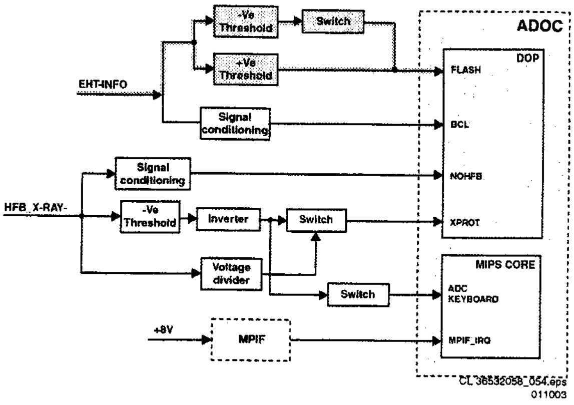


Figure 5-7 Flash Protection

5.7.5 Hardware Related Protections

Due to the architecture (read "hot" deflection), some protections cannot be sensed by the microprocessor. These protections will lead to a protection on set level (Standby mode and blinking LED).

Arc Protection
If there are "open" connections (e.g. bad solder joints) in the high-energy deflection circuitry, this can lead to damaging effects (read: fire). For that reason, the E/W current is sensed (via 3479//3480). If this current becomes too high, the "thyristor" circuit (TS7653 and TS7654) is triggered. TS7442 is switched "on" and TS7443 is forced into conduction. The "SUP-ENABLE" signal is shorted now to ground level, which will force the Main Power Supply to Standby mode. This prevents further arcing.

Vertical Protection
If the frame stage generates no pulses, TS7641 will block. TS7443 is now switched "on", which will lead to Standby mode. Therefore, in normal operation condition, TS7641 and TS7652 are conducting, while TS7443 is blocked.

EW protection
Several faults in the defection circuit can cause excessive currents through MOSFET 7480. The temperature of this device can become too high, causing an unsafe situation. The power supply is shut down in the above-mentioned way.
Caution: All hardware deflection protections can be disabled by interrupting R3403 on the LSP.
However, be careful: unsafe situations (heat) can occur or the picture tube can be destroyed.

Bridge coil protection
According safety regulations, every coil may be short-circuited. By doing this in the secondary winding of coil L5422, high currents will flow in the winding. With no safety circuit, the coil will begin to burn soon.
This is sensed via the "EW" signal going to the base of TS7652 (via R3495 and D6499). In a normal situation, the voltage on C2498 (diagram A4) is high and TS7652 is conducting. When bridge coil 5422 (diagram A3) is short circuited, the voltage on C2498 changes to low, which will block TS7652. In this case, also TS7641 will block and the voltage on 2642 will rise until TS7443 is forced in conduction. The "SUP-ENABLE" signal (in normal operating condition -20 V) is shorted now to ground level, which will force the Main Power Supply to Standby mode.
Note: Maximum EW width settings can also cause a protection.

5.8 Repair tips

5.8.1 Miscellaneous

The relay you hear when you switch the set "on" (from Standby or via the mains switch), is from the degaussing circuitry. It is **not** used for switching the Power Supply (as done in the MG-chassis).

- Take care not to touch the "hot" heatsink while disconnecting the SSP, despite the fact that the mains cord is out of the mains socket. There still can be an annoying rest-voltage on the heatsink for a short while, because the discharge resistors 3502 and 3503 (on the LSP between hot and cold part) are not stuffed for Europe. Instead, discharge resistors 3066 and 3057 on the Mains Switch panel are used, but because they are located **before** the Mains switch, they only discharge when this switch is "on". **Advice:** when you want to disconnect the SSP, first disconnect the Mains cord, but keep the Mains Switch in the "on" position.
- Where the circuitry was too "crowded" for service printing, you can find the correct location on the "test point overviews" in this manual.
- **A very large part of the LSP is "hot",** such as:
  - The primary part of the Standby Supply.
  - The whole Main supply (except for the secondary Audio supply).
  - And the complete deflection circuitry (so notice that the deflection coil is hot!).

5.8.2 Start-up/Shut-down Sequence

For a detailed description, see chapter 9 " Circuit Descriptions, Abbreviation List, and IC Data Sheets".

5.8.3 ComPair

This chassis does not have an IR transmitting LED (as in MG-sets). Therefore, a "Service" (ComPair) connector is implemented at the rear side of the set, which is directly accessible. In addition to this, there is also a blinking LED procedure to show the contents of the error buffer.

When you use ComPair, you have the possibility to activate a "stepwise start-up" mode. With this mode, you can initiate the start-up sequence step by step. This also means that in certain steps, some protections are not activated. This is sometimes very convenient during repair.

5.8.4 Protections

Activating SDM via the "service pads" will overrule the processor-controlled protections, but **not** the hardware protections.
Caution: When doing this, the service technician must know what he is doing, as it could lead to damaging the set.

The "ARC"- and/or "BRIDGECOIL" protection are hardly ever triggered, however:

- When you suspect the "ARC" protection, look for bad solder joints and smell. By interrupting resistor 3497, this protection is disabled (special attention needed!).
- When you suspect the "BRIDGECOIL" protection, which can also be due to a too wide picture amplitude, shorten G and S of the E/W MOSFET 7480. This will disable the protection. You will now have minimal horizontal amplitude. Re-align the horizontal amplitude in the SAM menu and remove the G/S short of TS7480.

5.8.5 Main Supply

1. Replace FET 7504 and zener 6505.
2. Disconnect the SSP panel.
3. Short B and E of TS7529, in order to put the Main Supply in "on"-mode (TS7529 is blocking then).
   Caution: To prevent that R3403 and TS7443 will be damaged, **first disable the HW-protection of the deflection circuit.** Therefore, short-circuit C2642 on the LSP (diagram A4).
4. Attach a load of 500 Ω to the V_BAT capacitor C2515 (the supply can not work without a minimum load).
5. Use a variac, and slowly increase the V_MAINS. Measure over sensing resistors R3514//15, if a nice sawtooth voltage becomes available.
6. Also, measure the V_BAT. This may never exceed +141 V. If it does, there is something wrong in the feedback circuitry (e.g. regulator 7506).

Note: Be careful when measuring on the gate of FET TS7504. This circuitry is very high ohmic and can easily be damaged (first connect ground to measuring equipment, than measure the gate).

5.8.6 Frame Deflection

Caution: When the Frame Deflection circuitry is suspected, one must be careful. Because there is a DC-voltage on the frame deflection, **the beam current could damage the CRT neck, leading to a defective CRT.**

To prevent this from happening, you must:
1. Interrupt the resistors 3403 and 3404 on the CRT panel (diagram F), in order to remove the "filament" voltage from the tube (no beam current, so no chance of destroying the CRT).
2. Interrupt resistor 3403 on the LSP (diagram A4) to disable the "SUP-ENABLE" line.
3. Measure with a multi-meter, or better with an oscilloscope, the functionality of the Frame stage.
4. After you have found the cause, exchange the defective component (e.g. TDA8177), and re-solder the interrupted resistors.

Table 5-3 Repair tips

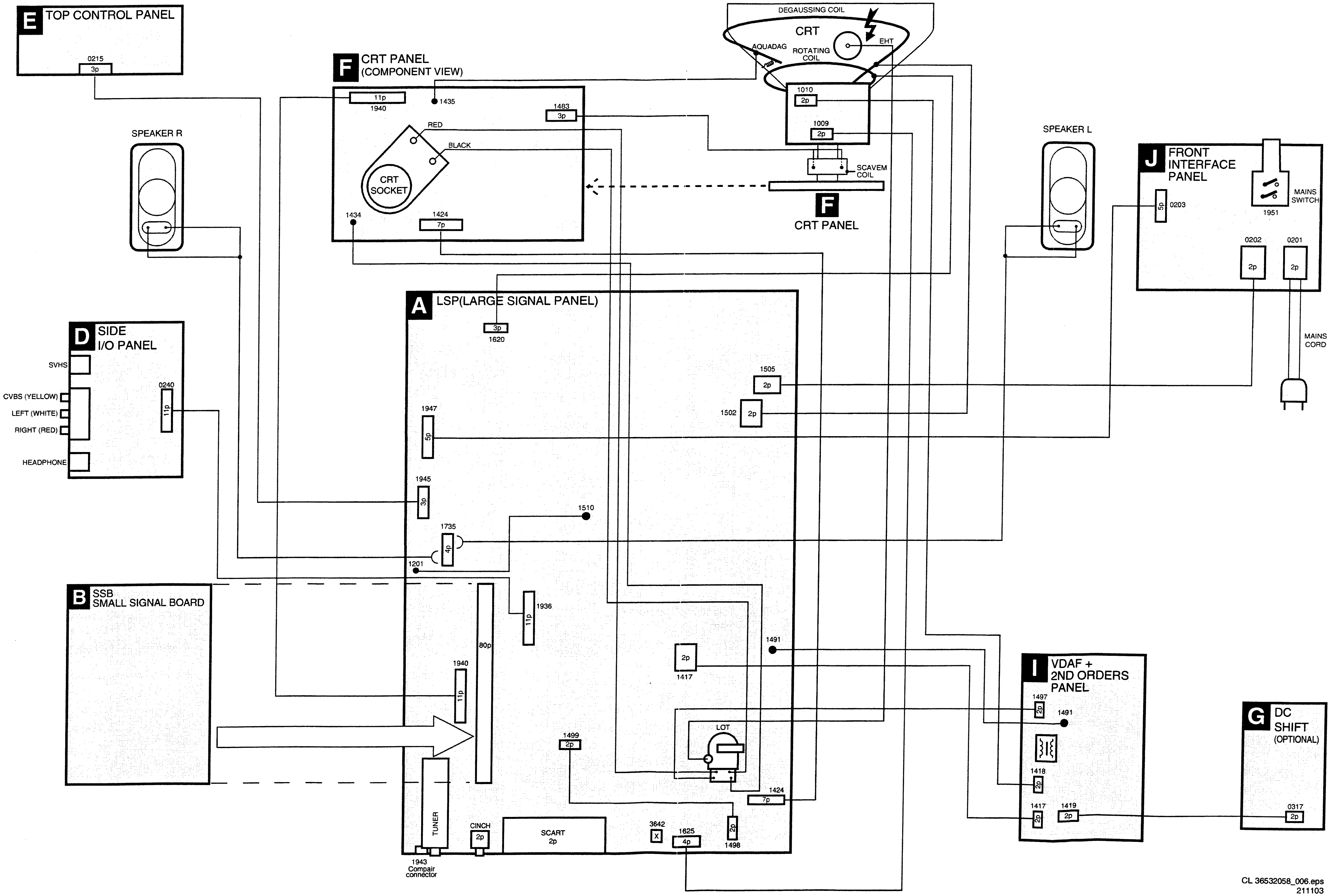
Phenomenon	Possible Cause	Repair tip
No picture, no LED.	Standby Supply defective.	Measure circuitry (see diagram A2). Start at test-point A19.When the Mains switch is "on", this voltage must always be available.
No picture, LED blinking at 3 Hz.	Set is in protection due to various causes. For error codes see error-code list.	You have no picture, so: read the error buffer via ComPair (error buffer is accessible when set is in protection, ComPair-file will guide you to this). Read the blinking LED information via standard remote command mute-06250x-ok. Or you read the error code sequence via standard remote command mute-062500-ok. When you have found the error, check the circuitry related to the supply voltage and I2C-communication or the circuitry that triggers the protection.
No picture, LED blinking with code 8-8-8-etc or 9-9-9-etc.	No communication on slow I2C- or fast I2C-bus.	As processor cannot communicate with one of the 2 busses it the standby-LED spontaneously starts blinking 8-8-8-etc or 9-9-9-etc... If in the error buffer somewhere is an error 8 or 9, these will have the highest priority starting the mentioned blinking. Measure dependent of the error on the I2C-bus which device is loading the bus (use the I2C-overview)
No picture, LED blinking with code 13-13-13-etc.	No communication on NVM-I2C bus to the uP.	As the uP cannot communicate with the NVM I2C bus, it spontaneously starts blinking 13-13-13-etc. Note: when there is no access to the NVM, a lot of picture setting can go wrong.
No picture, no sound. Set is making audible squeaking sound	Supply is possibly in hiccup-mode, which is audible via a squeaking supply transformer.	Possible causes: V_BAT is shorted (caused by short circuited line transistor 7421), the sound winding is shorted (amplifier is shorting the power supply lines), or D6514 is shorted (due to a too high V_BAT). Remove excessive load, to see what causes the failure, or check feedback circuit. See repair tip "Main Power Supply" (supply needs a minimal load).
No picture, no sound. Front LED works fine	Supply does not work correctly.	If e.g. V_BAT is only about 90 V, it is possible that the regulator IC (7506) is defective.
No RC-reception. Front LED does not echo RC-commands.	uP circuitry or RC-receiver is defective.	In case the set does react on a local keyboard operation, you must check the RC-receiver circuitry (diagram J).
Relay (degaussing) is not audible; when set is switched from "off" or "standby" to "on".	uP is not working correctly. When line "DEGAUS" is low, the degaussing must be activated.	Check RESET-circuitry (IC7581 on diagram B11). Check the level on line "DEGAUS" when you switch the set "on". Signal must be low initially and go to high after approx. 12 s.
Picture is rotated.	Rotation circuitry (if present) on diagram A5, or related supply to it, malfunctions.	Measure test points on diagram A5.
Picture is continuously switching "off" and "on", showing heavy "switch" spots (set does not go into protection).	200 V is missing on CRT panel.	Probably a bad connection from LSP connector 1424 to CRT connector 1424 (diagram F), or an interruption of the 200 V supplies line (e.g. R3341 on circuit F1 is interrupted).
Picture is not sharp.	Focus is possibly mis-aligned or SCAVEM-circuitry does not work correctly.	Re-align the "FOCUS" potmeter on the Line Output Transformer, or check the SCAVEM circuitry on the CRT-panel (diagram F). It is also possible that the DAF circuitry is defective (see diagram I). Check the V_dc values.
Picture is distorted.	Check video-path in Service Default Mode.	Investigate whether there is an error code present in the error buffer. In case there is one, check the I2C-bus and/or supply lines (see overview supply lines). Measure and check signal path Tuner-MPIF-ADOC-RGB amplifier. In case it is a geometry issue, check on diagram A4 opto-coupler 7482, OpAmps 7440/7450 and the Frame circuitry alignments or a possible corrupted NVM (IC7525 on diagram B11).
No menu, no OSD.	Probably a defective uP (ADOC).	
No Teletext.	IC7730 defective or not powered.	Check circuitry around IC7730 on diagram B13.
Strange switch "off" behaviour	TS7445 possibly defective.	Check, with a multi-meter, whether transistor TS7445 is well functioning. (diagram A3).
Various symptoms, due to missing local supply voltage.	An interrupted fuse, NFR-resistor or connection.	When no symptom or error code leads you to a specific circuitry, use the supply lines overview (see supply lines overview), for a quick scan of all supply lines.

5.9 Software Downloading

In this chassis, you can **upgrade** the software via ComPair. You can find more information on how this procedure works in the ComPair file. It is possible that not all sets are equipped with the hardware, needed to make software upgrading possible. To speed up the programming process the firmware of the ComPair interface can be upgraded. See paragraph "How To Order" for the order numbers.

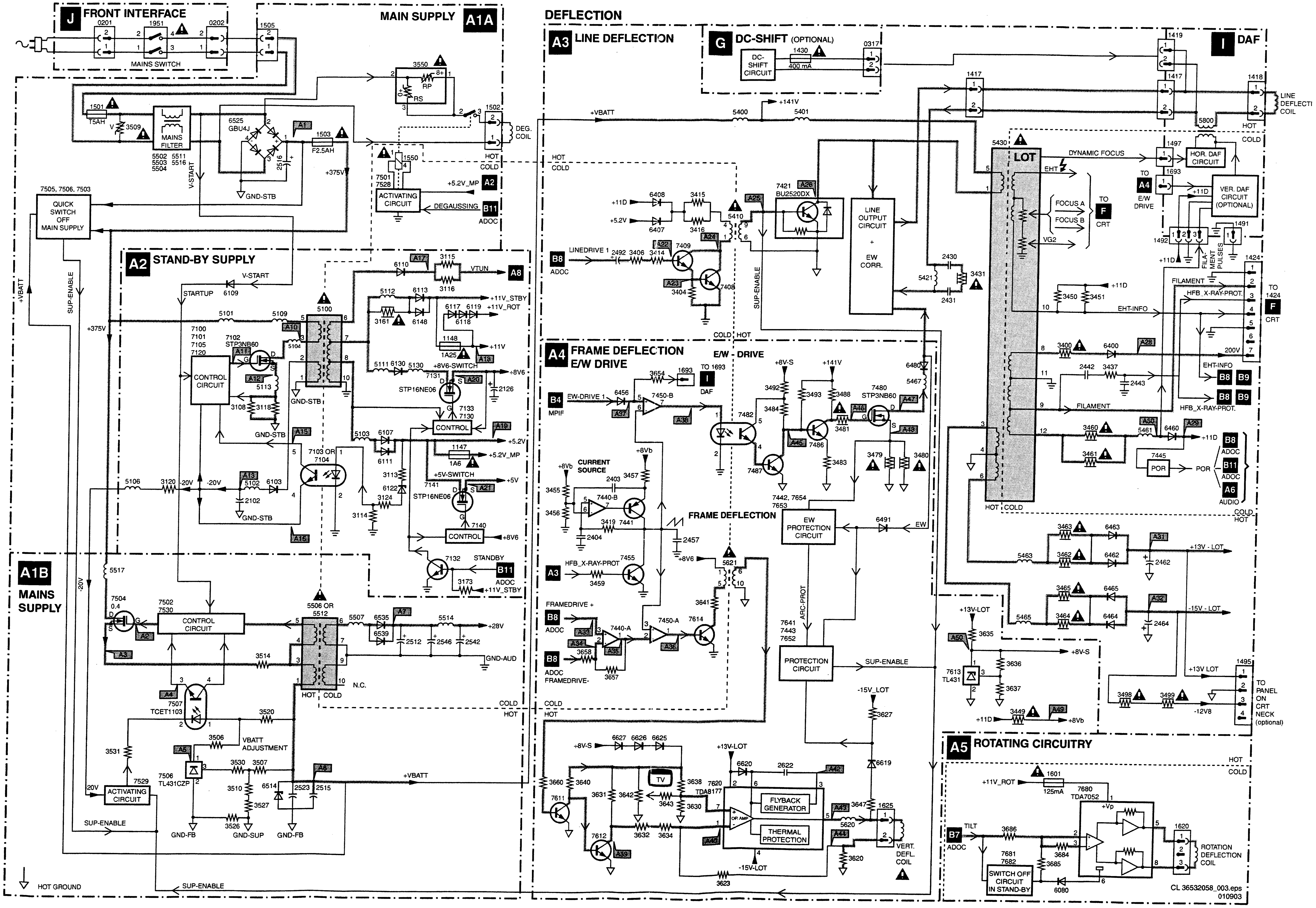
6. Block Diagrams, Testpoint Overview, and Waveforms

Wiring Diagram


E TOP CONTROL PANEL
0215
3p
F CRT PANEL (COMPONENT VIEW)
11p
1940
1435
1483
3p
RED
BLACK
CRT SOCKET
1434
1424
7p
DEGAUSSING COIL
CRT
AQUADAG
ROTATING COIL
EHT
1010
2p
1009
2p
SCAVEM COIL
F CRT PANEL
SPEAKER R
SPEAKER L
J FRONT INTERFACE PANEL
5p
0203
MAINS SWITCH
1951
0202
0201
2p
2p
MAINS CORD
A LSP(LARGE SIGNAL PANEL)
3p
1620
1505
2p
1502
2p
1947
5p
1945
3p
1510
1735
4p
1201
1936
11p
1491
2p
1417
80p
1940
11p
1499
2p
LOT
1424
7p
TUNER
CINCH
2p
SCART
2p
3642
X
1625
4p
2p
1498
1943
Compair connector
D SIDE I/O PANEL
SVHS
CVBS (YELLOW)
LEFT (WHITE)
RIGHT (RED)
HEADPHONE
0240
11p
B SSB SMALL SIGNAL BOARD
I VDAF + 2ND ORDERS PANEL
1497
2p
1491
1418
2p
1417
2p
1419
2p
G DC SHIFT (OPTIONAL)
0317
2p

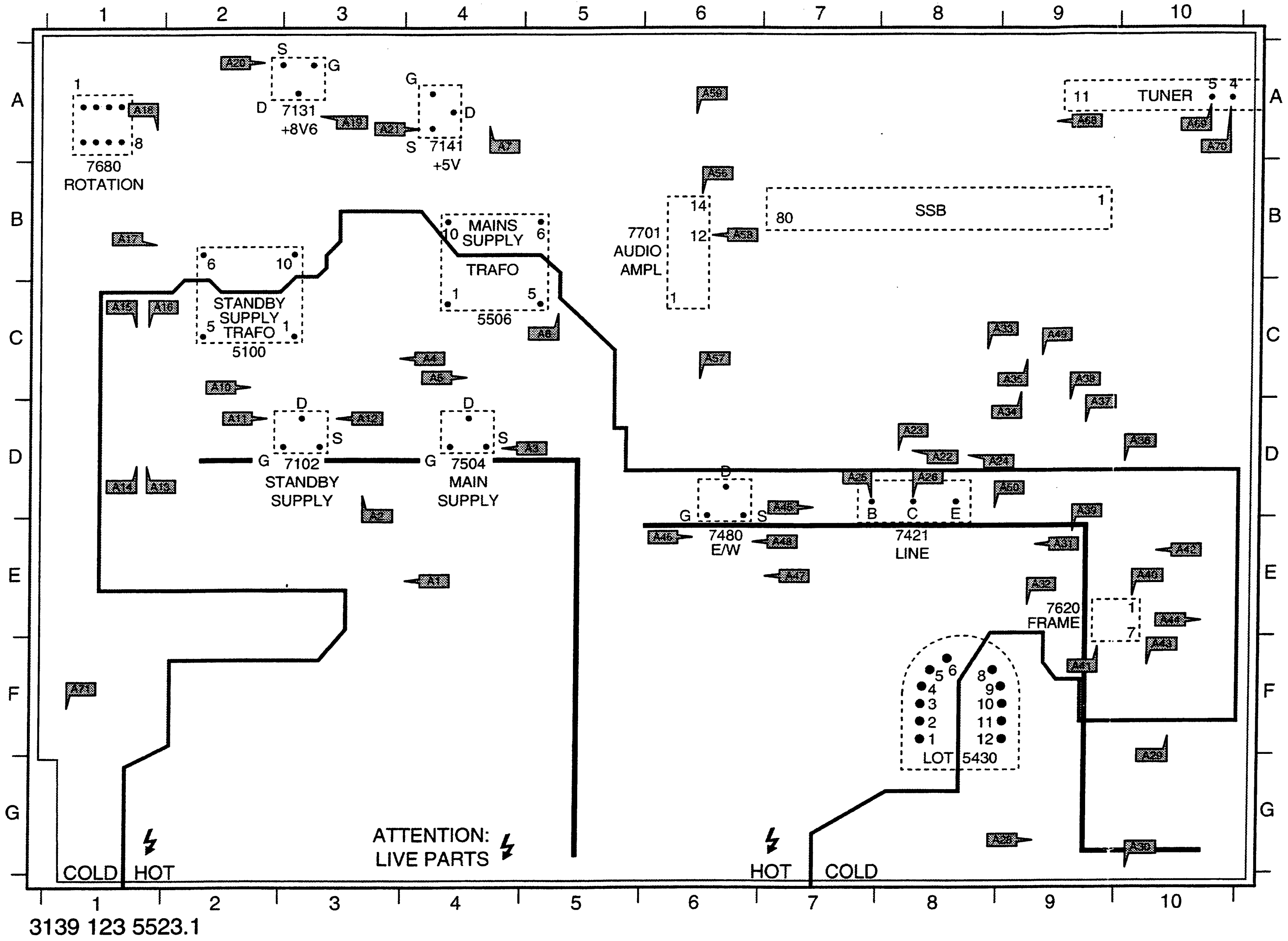
CL 36532058_006.eps
211103

Block Diagram LSP Supply and Deflection


J FRONT INTERFACE
0201
1951
0202
MAINS SWITCH
MAIN SUPPLY A1A
1505
1501 T5AH
3509
MAINS FILTER
5502 5511
5503 5516
5504
6525 GBU4J
2516
1503 F2.5AH
+375V
3550
RP
RS
1502
DEG. COIL
HOT
COLD
1550
7501 7528
ACTIVATING CIRCUIT
+5.2V_MP A2
DEGAUSSING B11
ADOC
V-START
GND-STB
7505, 7506, 7503
QUICK SWITCH OFF MAIN SUPPLY
+VBATT
SUP-ENABLE
A2 STAND-BY SUPPLY
V-START
STARTUP 6109
+375V
5101 5109
5100
7100 7101 7105 7120
7102 STP3NB60
CONTROL CIRCUIT
5113
5104
3108 3118
GND-STB
6110 3115 VTUN A8
5112 6113 3116
+11V_STBY
6117 6119 +11V_ROT
3161 6148 6118
1148 1A25 +11V
5111 6130 5130 +8V6-SWITCH
7131
STP16NE06
+8V6
2126
7133 7130
CONTROL
5103 6107
6111
+5.2V
1147 1A6
+5.2V_MP
+5V-SWITCH
7141 STP16NE06
+5V
3113
6122
3124
3114
7140
CONTROL +8V6
7103 OR 7104
5106 3120 -20V -20V
5102 6103
2102
GND-STB
7132
STANDBY B11
3173 ADOC
+11V_STBY
A1B MAINS SUPPLY
5517
-20V
7504 0.4
7502 7530
CONTROL CIRCUIT
5506 OR 5512
5507 6535 5514
6539
2512 2546 2542
+28V
3514
GND-AUD
N.C.
HOT COLD
7507 TCET1103
3520
3506 VBATT ADJUSTMENT
3531
7529
20V ACTIVATING CIRCUIT
7506 TL431CZP
3530 3507
3510
3527
6514 2523 2515
+VBATT
3526
GND-FB GND-SUP GND-FB
SUP-ENABLE
HOT GROUND
SUP-ENABLE
DEFLECTION
A3 LINE DEFLECTION
G DC-SHIFT (OPTIONAL)
DC-SHIFT CIRCUIT
1430 400 mA
0317
+VBATT
5400 +141V 5401
6408 3415
+11D
+5.2V
6407 3416
5410
B8 ADOC
LINEDRIVE 1 2492 3406 3414
7409
7408
3404
7421 BU2520DX
LINE OUTPUT CIRCUIT + EW CORR.
SUP-ENABLE
2430
5421 3431
2431
COLD HOT
A4 FRAME DEFLECTION E/W DRIVE
E/W - DRIVE
3654 1693
TO 1693 I DAF
B4 MPIF
EW-DRIVE 1 6456
7450-B
+8V-S
+141V
3492
3493 3488
7480 STP3NB60
3484
7482
3481
7486
3483
7487
3479 3480
7442, 7654 7653
6480
5467
CURRENT SOURCE
+8Vb
2403 3457
3455
3456
7440-B
3419 7441
2404
FRAME DEFLECTION
2457
+8V6
A3
HFB_X-RAY-PROT 7455
3459
5621
EW PROTECTION CIRCUIT
6491 EW
B8 ADOC
FRAMEDRIVE +
7440-A
7450-A
7614
3641
3658
3657
ADOC FRAMEDRIVE-
ARC-PROT
7641 7443 7652
PROTECTION CIRCUIT
SUP-ENABLE
-15V_LOT
3627
6619
+8V-S 6627 6626 6625
+13V-LOT
6620 2622
3660 3640
7611
3631 3642
TV
3643
3638 7620 TDA8177
3630
FLYBACK GENERATOR
THERMAL PROTECTION
7612
3632 3634
5620
3647 1625
VERT. DEFL. COIL
3620
3623
-15V-LOT
I DAF
1419
1417
1418
LINE DEFLECTION COIL
5800
HOT
COLD
5430
LOT
DYNAMIC FOCUS
EHT
FOCUS A
FOCUS B
VG2
TO F CRT
1497
HOR. DAF CIRCUIT
1693
A4 E/W DRIVE
VER. DAF CIRCUIT (OPTIONAL)
+11D
1492
1491
FILA-MENT PULSES
1424
FILAMENT
HFB_X-RAY-PROT.
TO 1424 F CRT
3450 3451
EHT-INFO
3400 6400
200V
2442 3437
2443
EHT-INFO B8 B9
FILAMENT
HFB_X-RAY-PROT. B8 B9
3460 5461 6460
+11D B8 ADOC
3461
7445 POR
POR B11 ADOC A6 AUDIO
HOT COLD
3463 6463
5463
3462 6462
+13V - LOT
2462
3465 6465
5465
3464 6464
-15V - LOT
2464
+13V-LOT
3635
+8V-S
7613 TL431
3636
3637
+11D 3449 +8Vb
+13V LOT
1495
3498 3499
-12V8
TO PANEL ON CRT NECK (optional)
A5 ROTATING CIRCUITRY
1601
+11V_ROT 125mA
7680 TDA7052
+Vp
B7 ADOC
TILT 3686
7681 7682
3684
3685
SWITCH OFF CIRCUIT IN STAND-BY
6080
1620
ROTATION DEFLECTION COIL
CL 36532058_003.eps
010903

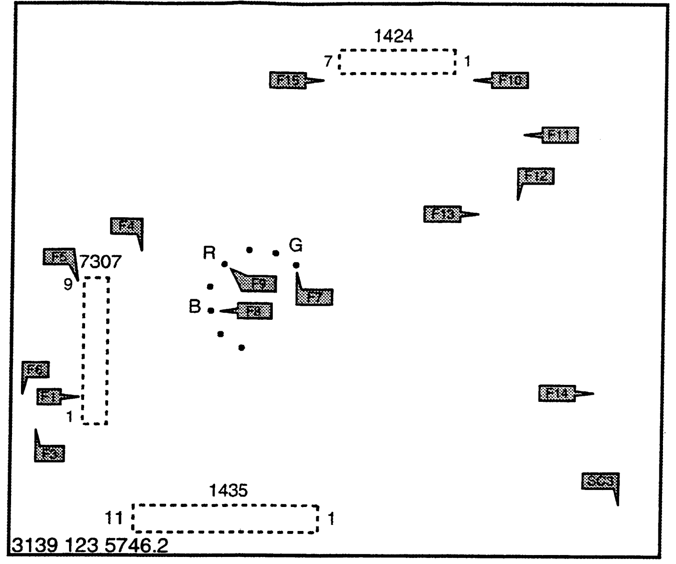
Testpoint Overview LSP and CRT

LSP COPPER TRACK SIDE

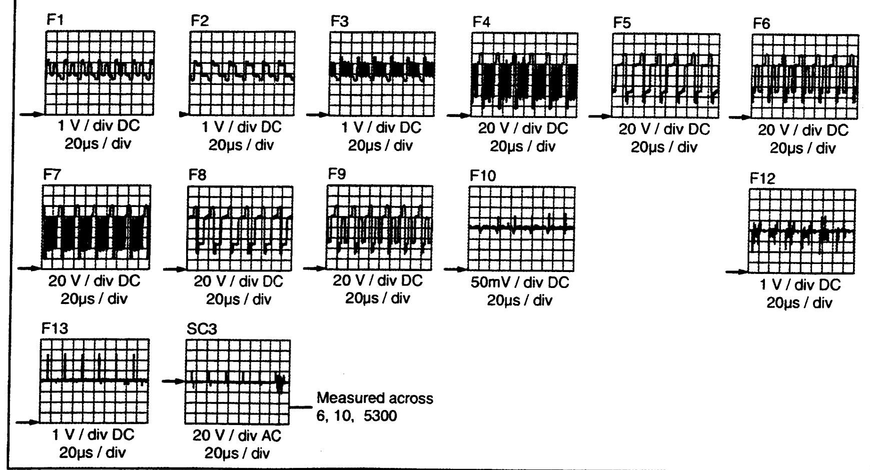

1 2 3 4 5 6 7 8 9 10
A B C D E F G
7680
ROTATION
7131
+8V6
7141
+5V
S D G
TUNER
11
5 4
MAINS SUPPLY
TRAFO
5506
STANDBY SUPPLY TRAFO
5100
7701
AUDIO AMPL
14
12
80
SSB
7102
STANDBY SUPPLY
7504
MAIN SUPPLY
7480
E/W
7421
LINE
B C E
7620
FRAME
LOT 5430
ATTENTION: LIVE PARTS
COLD
HOT
HOT
COLD
3139 123 5523.1

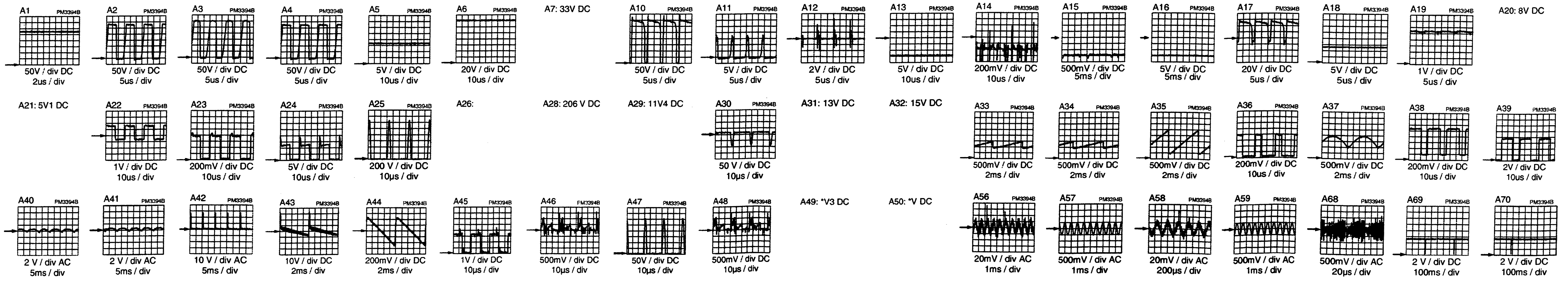
A1	E4
A2	D3
A3	D4
A4	C4
A5	C4
A6	C5
A7	A4
A10	C2
A11	C2
A12	D3
A13	D1
A14	D1
A15	C1
A16	C1
A17	B1
A18	A1
A19	A3
A20	A2
A21	A3
A22	D8
A23	D8
A24	D8
A25	D8
A26	D7
A28	G9
A29	G10
A30	G10
A31	E9
A32	E9
A33	C8
A34	D9
A35	C9
A36	D10
A37	D9
A38	C9
A39	D10
A40	E10
A41	E10
A42	E10
A43	F10
A44	E10
A45	D7
A46	E6
A47	E7
A48	E7
A49	C9
A50	D9
A56	C6
A57	B6
A58	C6
A59	B5
A68	A9
A69	A10
A70	A10

CRT PANEL (COPPER TRACK SIDE)


1424
7
1
F15
F10
F11
F12
F13
F4
F5
7307
9
1
R
G
B
F9
F7
F8
F6
F1
F3
F14
SC3
1435
11
1
3139 123 5746.2

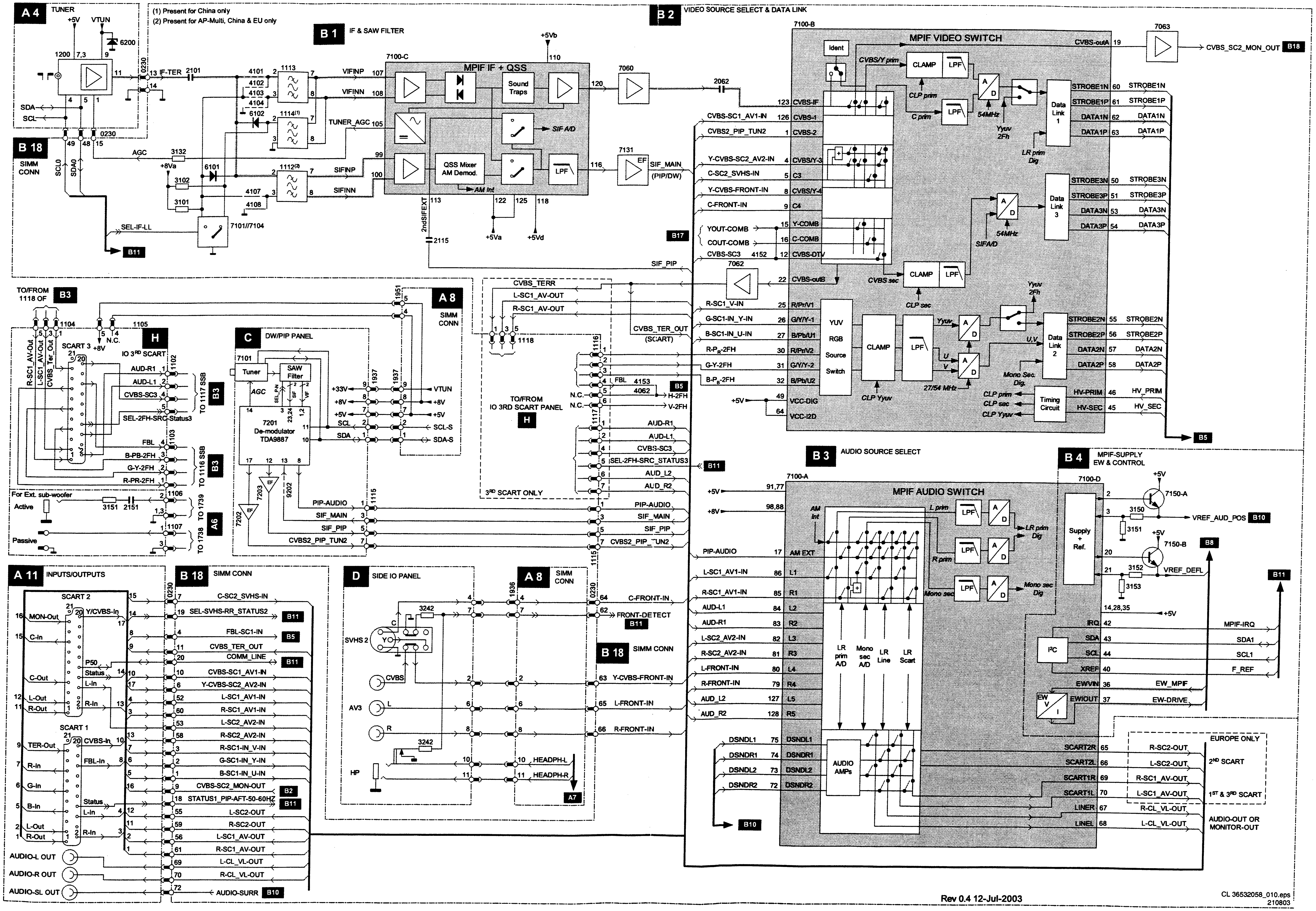
F1	E4
F2	D3
F3	D4
F4	C4
F5	C4
F6	C5
F7	A4
F10	C2
F11	C2
F12	D3
F13	D1
14	D1
A15	C1
A16	C1
A17	B1
A18	A1
A19	A3
A20	A2
A21	A3
A22	D8
A23	D8
A24	D8



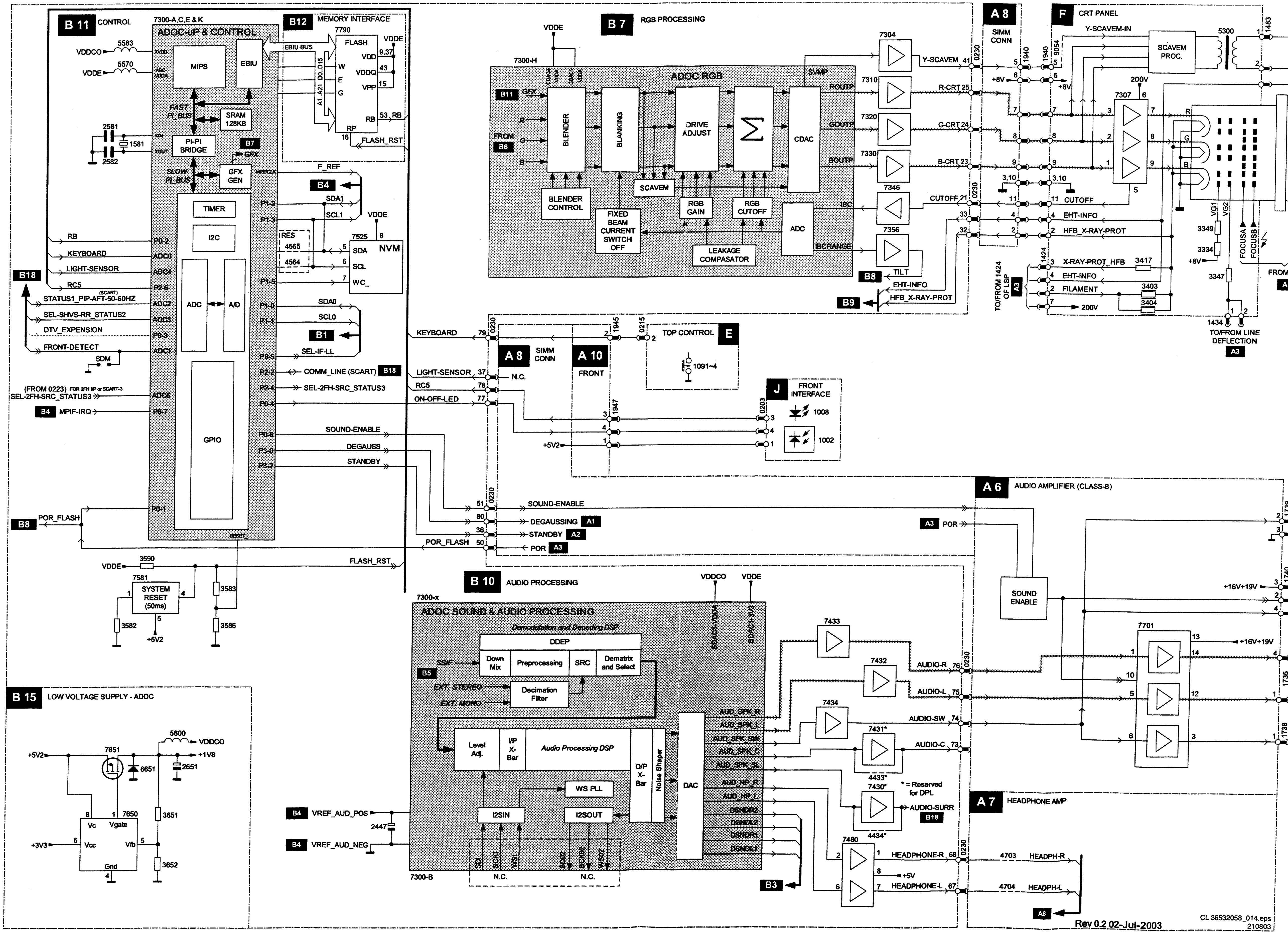


CL 36532058_007.eps
071003

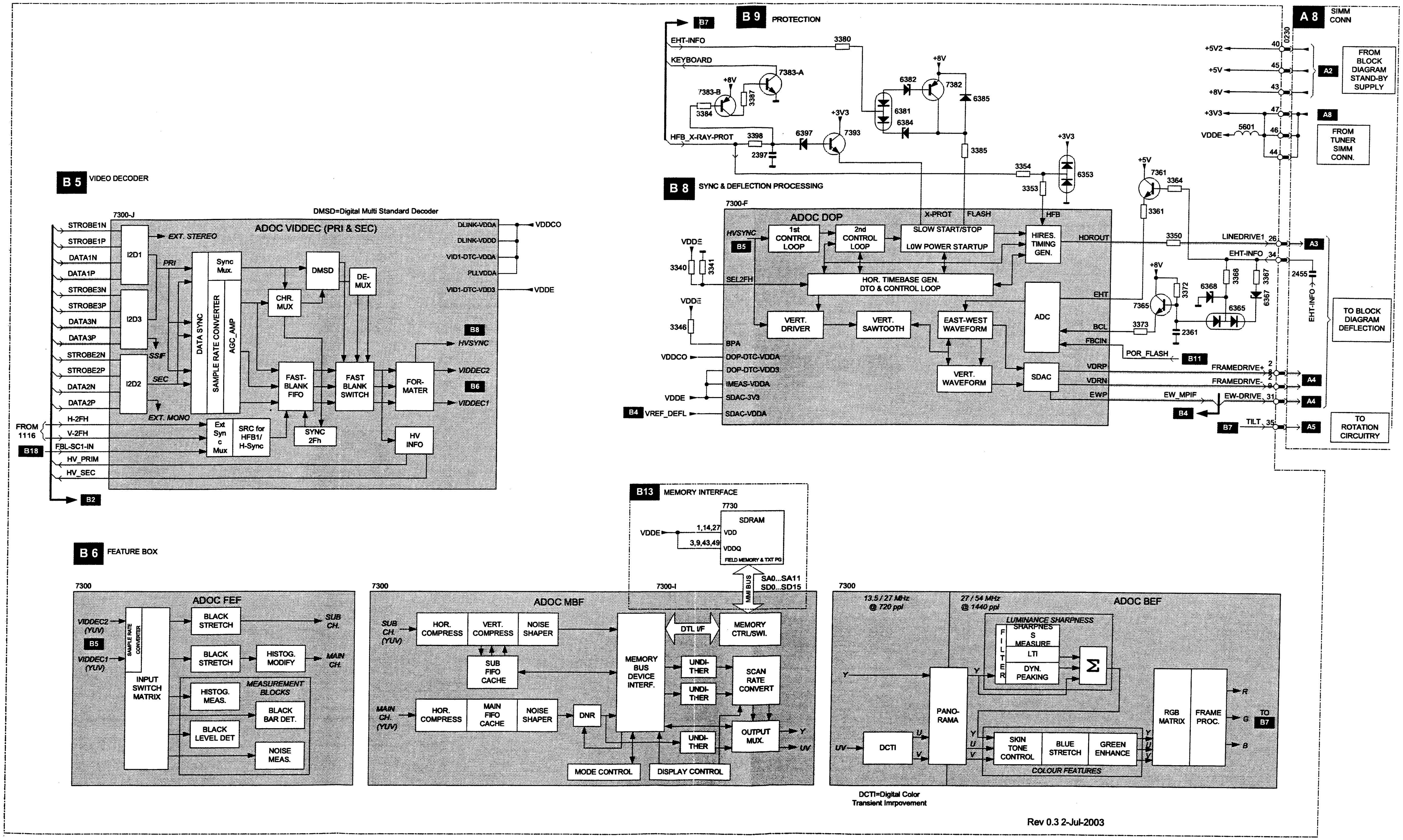
Block Diagram 1 Audio & Video


A 4
TUNER
+5V
VTUN
6200
1200
7,3
9
11
0230
13
IF-TER
2101
14
SDA
SCL
4
5
1
0230
(1) Present for China only
(2) Present for AP-Multi, China & EU only
B 1
IF & SAW FILTER
+5Vb
110
7100-C
MPIF IF + QSS
4101
4102
4103
4104
6102
1113
1114(1)
1112(2)
VIFINP
VIFINN
TUNER_AGC
107
108
105
99
100
SIFINP
SIFINN
Sound Traps
QSS Mixer AM Demod.
AM Int
SIF A/D
LPF
120
116
7060
7131
EF
SIF_MAIN (PIP/DW)
113
122
125
118
2ndSIFEXT
2115
+5Va
+5Vd
B 18
SIMM CONN
SCL0
SDA0
49
48
15
AGC
3132
+8Va
6101
3102
3101
4107
4108
SEL-IF-LL
7101//7104
B11
B17
SIF_PIP
B 2
VIDEO SOURCE SELECT & DATA LINK
7100-B
MPIF VIDEO SWITCH
Ident
CVBS/Y prim
CLAMP
LPF
CLP prim
C prim
54MHz
Yyuv 2Fh
LR prim Dig
A D
Data Link 1
Data Link 3
Data Link 2
CVBS-outA 19
7063
CVBS_SC2_MON_OUT
B18
2062
123 CVBS-IF
CVBS-SC1_AV1-IN 126 CVBS-1
CVBS2_PIP_TUN2 1 CVBS-2
Y-CVBS-SC2_AV2-IN 4 CVBS/Y-3
C-SC2_SVHS-IN 5 C3
Y-CVBS-FRONT-IN 8 CVBS/Y-4
C-FRONT-IN 9 C4
YOUT-COMB 15 Y-COMB
COUT-COMB 16 C-COMB
CVBS-SC3 4152 12 CVBS-DTV
7062
22 CVBS-outB
CVBS sec
CLP sec
SIFA/D
STROBE1N 60 STROBE1N
STROBE1P 61 STROBE1P
DATA1N 62 DATA1N
DATA1P 63 DATA1P
STROBE3N 50 STROBE3N
STROBE3P 51 STROBE3P
DATA3N 53 DATA3N
DATA3P 54 DATA3P
STROBE2N 55 STROBE2N
STROBE2P 56 STROBE2P
DATA2N 57 DATA2N
DATA2P 58 DATA2P
HV-PRIM 46 HV_PRIM
HV-SEC 45 HV_SEC
R-SC1_V-IN 25 R/Pr/V1
G-SC1-IN_Y-IN 26 G/Y/Y-1
B-SC1-IN_U-IN 27 B/Pb/U1
R-PR-2FH 30 R/Pr/V2
G-Y-2FH 31 G/Y/Y-2
B-PB-2FH 32 B/Pb/U2
+5V 49 VCC-DIG
64 VCC-I2D
YUV RGB Source Switch
CLAMP
LPF
CLP Yyuv
27/54 MHz
U V
Mono Sec. Dig.
CLP prim
CLP sec
CLP Yyuv
Timing Circuit
B5
TO/FROM 1118 OF
B3
1104
1105
SCART 3
+8V
N.C.
R-SC1_AV-Out
L-SC1_AV-Out
CVBS_Ter_Out
H
IO 3RD SCART
AUD-R1
AUD-L1
CVBS-SC3
SEL-2FH-SRC-Status3
FBL
B-PB-2FH
G-Y-2FH
R-PR-2FH
1102
1103
TO 1117 SSB
TO 1116 SSB
For Ext. sub-woofer
Active
3151
2151
Passive
1106
1107
TO 1739
TO 1738
A6
C
DW/PIP PANEL
7101
Tuner
SAW Filter
AGC
7201 De-modulator TDA9887
+33V
+8V
+5V
SCL
SDA
1937
VTUN
SCL-S
SDA-S
7203
7202
9202
EF
PIP-AUDIO
SIF_MAIN
SIF_PIP
CVBS2_PIP_TUN2
1115
1951
A 8
SIMM CONN
CVBS_TERR
L-SC1_AV-OUT
R-SC1_AV-OUT
1118
CVBS_TER_OUT (SCART)
TO/FROM IO 3RD SCART PANEL
3RD SCART ONLY
1116
1117
FBL 4153
4062
H-2FH
V-2FH
N.C.
AUD-R1
AUD-L1
CVBS-SC3
SEL-2FH-SRC_STATUS3
AUD_L2
AUD_R2
B11
B 3
AUDIO SOURCE SELECT
7100-A
MPIF AUDIO SWITCH
+5V 91,77
+8V 98,88
AM Int
PIP-AUDIO 17 AM EXT
L-SC1_AV1-IN 86 L1
R-SC1_AV1-IN 85 R1
AUD-L1 84 L2
AUD-R1 83 R2
L-SC2_AV2-IN 82 L3
R-SC2_AV2-IN 81 R3
L-FRONT-IN 80 L4
R-FRONT-IN 79 R4
AUD_L2 127 L5
AUD_R2 128 R5
L prim
R prim
Mono sec
LPF
A D
LR prim Dig
Mono sec Dig
LR prim A/D
Mono sec A/D
LR Line
LR Scart
DSNDL1 75 DSNDL1
DSNDR1 74 DSNDR1
DSNDL2 73 DSNDL2
DSNDR2 72 DSNDR2
AUDIO AMPs
B10
SCART2R 65 R-SC2-OUT
SCART2L 66 L-SC2-OUT
SCART1R 69 R-SC1_AV-OUT
SCART1L 70 L-SC1_AV-OUT
LINER 67 R-CL_VL-OUT
LINEL 68 L-CL_VL-OUT
EUROPE ONLY
2ND SCART
1ST & 3RD SCART
AUDIO-OUT OR MONITOR-OUT
B 4
MPIF-SUPPLY EW & CONTROL
7100-D
+5V
7150-A
Supply + Ref.
3150
3151
VREF_AUD_POS
B10
7150-B
3152
3153
VREF_DEFL
B8
B11
14,28,35
+5V
IRQ 42 MPIF-IRQ
SDA 43 SDA1
SCL 44 SCL1
XREF 40 F_REF
EWVIN 36 EW_MPIF
EWIOUT 37 EW-DRIVE
I2C
EW V I
A 11
INPUTS/OUTPUTS
SCART 2
MON-Out
C-In
C-Out
L-Out
R-Out
Y/CVBS-In
P50
Status
L-In
R-In
SCART 1
TER-Out
R-In
G-In
B-In
L-Out
R-Out
CVBS-In
FBL-In
Status
L-In
R-In
AUDIO-L OUT
AUDIO-R OUT
AUDIO-SL OUT
B 18
SIMM CONN
0230
C-SC2_SVHS-IN
SEL-SVHS-RR_STATUS2
FBL-SC1-IN
CVBS_TER_OUT
COMM_LINE
CVBS-SC1_AV1-IN
Y-CVBS-SC2_AV2-IN
L-SC1_AV1-IN
R-SC1_AV1-IN
L-SC2_AV2-IN
R-SC2_AV2-IN
R-SC1-IN_V-IN
G-SC1-IN_Y-IN
B-SC1-IN_U-IN
CVBS-SC2_MON-OUT
STATUS1_PIP-AFT-50-60HZ
L-SC2-OUT
R-SC2-OUT
L-SC1_AV-OUT
R-SC1_AV-OUT
L-CL_VL-OUT
R-CL_VL-OUT
AUDIO-SURR
B11
B5
B2
B10
D
SIDE IO PANEL
SVHS 2
Y
C
3242
CVBS
AV3
L
R
HP
1936
A 8
SIMM CONN
HEADPH-L
HEADPH-R
A7
B 18
SIMM CONN
64 C-FRONT-IN
62 FRONT-DETECT
63 Y-CVBS-FRONT-IN
65 L-FRONT-IN
66 R-FRONT-IN
Rev 0.4 12-Jul-2003
CL 36532058_010.eps
210803

Block Diagram 2 Audio & Video


B 11 CONTROL
7300-A,C,E & K
ADOC-uP & CONTROL
VDDCO
5583
VDDE
5570
MIPS
EBIU
FAST PI_BUS
SRAM 128KB
PI-PI BRIDGE
SLOW PI_BUS
GFX GEN
B7 GFX
2581
1581
2582
TIMER
I2C
ADC
A/D
GPIO
B12 MEMORY INTERFACE
7790
FLASH
VDDE
EBIU BUS
VDD
VDDQ
VPP
W
E
G
RP
RB
A1..A21 D0..D15
9,37
43
15
53 RB
16 FLASH_RST
F_REF
B4
SDA1
SCL1
VDDE
RES
4565
4564
7525 8
NVM
SDA
SCL
WC_
SDA0
SCL0
B1
SEL-IF-LL
COMM_LINE (SCART) B18
SEL-2FH-SRC_STATUS3
SOUND-ENABLE
DEGAUSS
STANDBY
P1-2
P1-3
P1-5
P1-0
P1-1
P0-5
P2-2
P2-4
P0-4
P0-6
P3-0
P3-2
P0-1
P0-2
ADC0
ADC4
P2-6
ADC2
ADC3
P0-3
ADC1
ADC5
P0-7
RB
KEYBOARD
LIGHT-SENSOR
RC5
B18
STATUS1_PIP-AFT-50-60HZ (SCART)
SEL-SHVS-RR_STATUS2
DTV_EXPENSION
FRONT-DETECT
SDM
(FROM 0223) FOR 2FH I/P or SCART-3
SEL-2FH-SRC_STATUS3
B4 MPIF-IRQ
B8 POR_FLASH
RESET_
VDDE
3590
7581
SYSTEM RESET (50ms)
3583
3582
3586
+5V2
FLASH_RST
B 7 RGB PROCESSING
VDDE
7300-H
ADOC RGB
B11 GFX
FROM B6
R
G
B
BLENDER
BLANKING
DRIVE ADJUST
Σ
CDAC
SVMP
ROUTP
GOUTP
BOUTP
IBC
IBCRANGE
BLENDER CONTROL
FIXED BEAM CURRENT SWITCH OFF
SCAVEM
RGB GAIN
RGB CUTOFF
ADC
LEAKAGE COMPASATOR
7304
Y-SCAVEM 41
7310
R-CRT 25
7320
G-CRT 24
7330
B-CRT 23
7346
CUTOFF 21
7356
33
32
B8 TILT
EHT-INFO
B9
HFB_X-RAY-PROT
A 8 SIMM CONN
0230
1940
9054
+8V
F CRT PANEL
Y-SCAVEM-IN
5300
1483
SCAVEM PROC.
SCAVEM COIL
200V
7307
CRT
R
G
B
CUTOFF
EHT-INFO
HFB_X-RAY-PROT
3,10
VG1
VG2
FOCUSA
FOCUSB
3349
3334
+8V
3347
EHT
FROM LOT A3
1424
TO/FROM 1424 OF LSP A3
X-RAY-PROT_HFB
3417
EHT-INFO
FILAMENT
3403
3404
200V
1434
TO/FROM LINE DEFLECTION A3
KEYBOARD 79
A 8 SIMM CONN
A 10 FRONT
1945
0215
TOP CONTROL E
1091-4
LIGHT-SENSOR 37
N.C.
RC5 78
ON-OFF-LED 77
1947
0203
J FRONT INTERFACE
1008
1002
+5V2
A 6 AUDIO AMPLIFIER (CLASS-B)
51 SOUND-ENABLE
80 DEGAUSSING A1
36 STANDBY A2
POR_FLASH 50
POR A3
A3 POR
1739
Ext. ACTIVE SUBWOOFER (via 3rd SCART Panel)
1740
Int. ACTIVE SUBWOOFER
+16V+19V
SOUND ENABLE
7701
+16V+19V
RIGHT
1735
LEFT
1738
Ext/Int. Passive SUB-WOOFER
B 10 AUDIO PROCESSING
VDDCO
VDDE
7300-x
ADOC SOUND & AUDIO PROCESSING
Demodulation and Decoding DSP
DDEP
SSIF
B5
Down Mix
Preprocessing
SRC
Dematrix and Select
EXT. STEREO
EXT. MONO
Decimation Filter
SDAC1-VDDA
SDAC1-3V3
Level Adj.
I/P X-Bar
Audio Processing DSP
O/P X-Bar
Noise Shaper
DAC
WS PLL
I2SIN
I2SOUT
SDI
SCKI
WSI
SDO2
SCKO2
WSO2
N.C.
N.C.
7300-B
B4 VREF_AUD_POS
2447
B4 VREF_AUD_NEG
AUD_SPK_R
AUD_SPK_L
AUD_SPK_SW
AUD_SPK_C
AUD_SPK_SL
AUD_HP_R
AUD_HP_L
DSNDR2
DSNDL2
DSNDR1
DSNDL1
B3
7433
7432
AUDIO-R 76
AUDIO-L 75
7434
AUDIO-SW 74
7431*
AUDIO-C 73
4433*
7430*
* = Reserved for DPL
AUDIO-SURR B18
4434*
7480
HEADPHONE-R 68
+5V
HEADPHONE-L 67
A 7 HEADPHONE AMP
4703 HEADPH-R
4704 HEADPH-L
A8
B 15 LOW VOLTAGE SUPPLY - ADOC
+5V2
7651
6651
5600
VDDCO
+1V8
2651
7650
Vc
Vgate
Vcc
Vfb
Gnd
+3V3
3651
3652
Rev 0.2 02-Jul-2003
CL 36532058_014.eps 210803

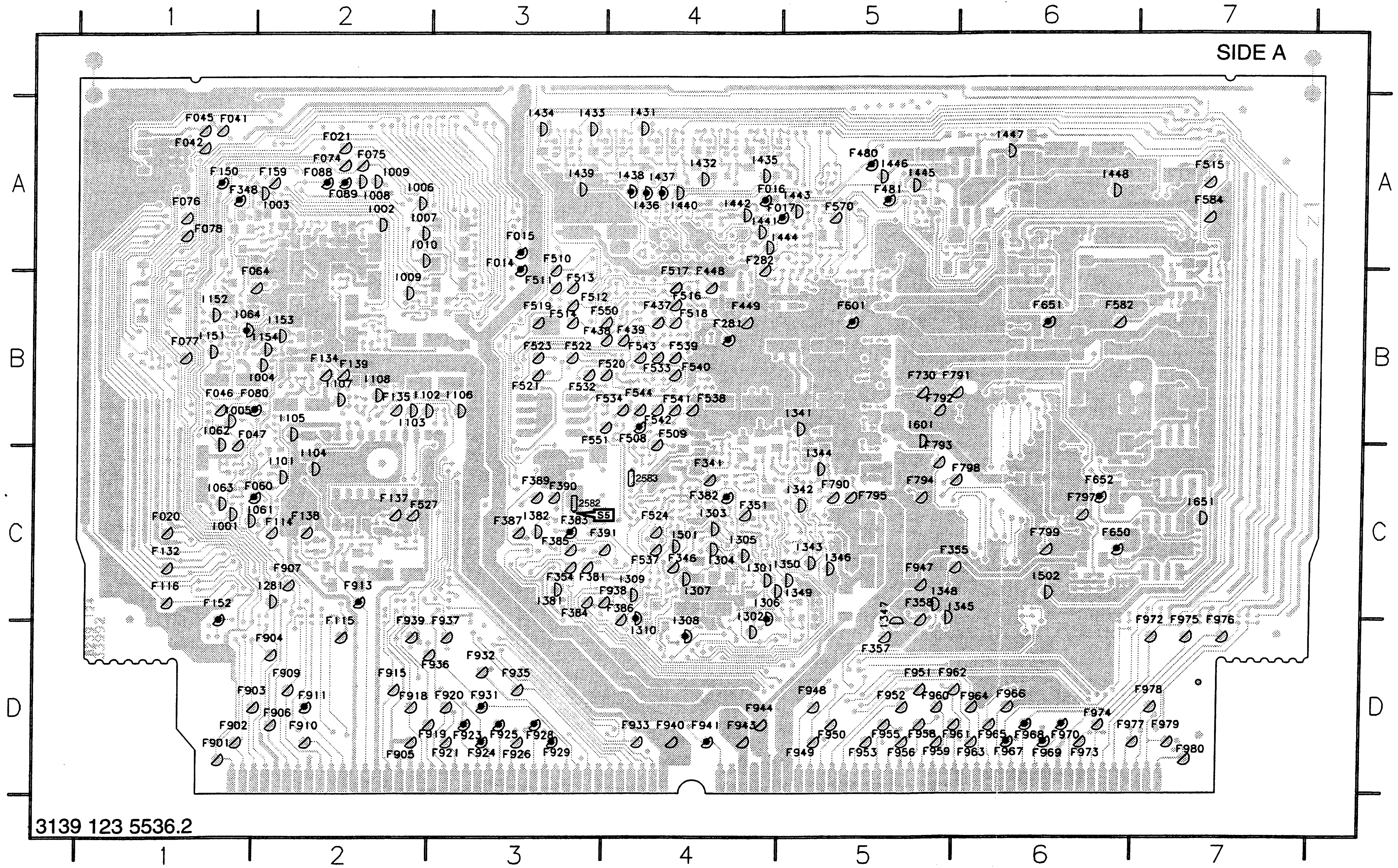
Block Diagram 3 Audio & Video

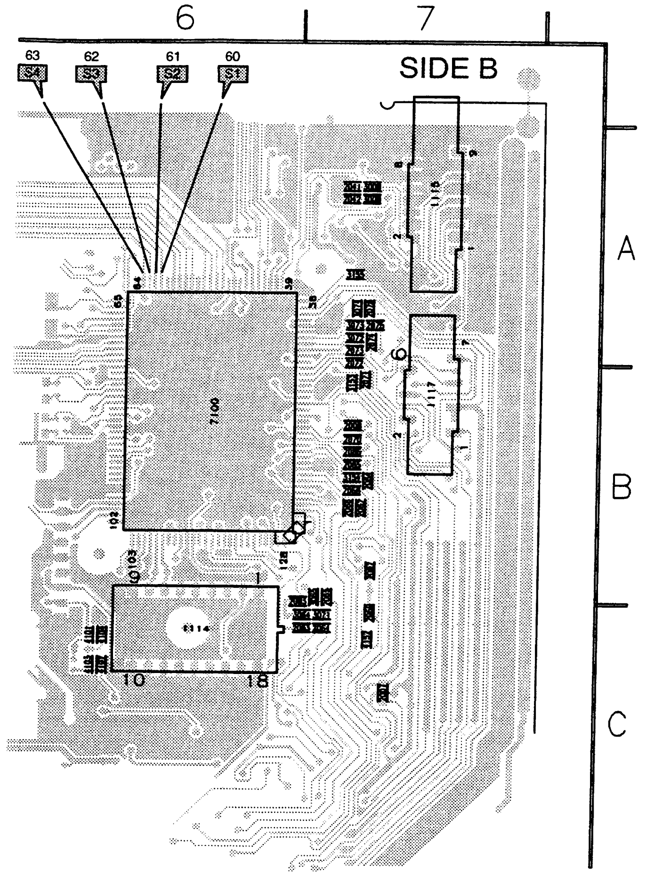

B 5
VIDEO DECODER
7300-J
DMSD=Digital Multi Standard Decoder
ADOC VIDDEC (PRI & SEC)
STROBE1N
STROBE1P
DATA1N
DATA1P
STROBE3N
STROBE3P
DATA3N
DATA3P
STROBE2N
STROBE2P
DATA2N
DATA2P
H-2FH
V-2FH
FBL-SC1-IN
HV_PRIM
HV_SEC
FROM 1116
B18
B2
I2D1
I2D3
I2D2
EXT. STEREO
PRI
SSIF
SEC
EXT. MONO
Sync Mux.
DATA SYNC
SAMPLE RATE CONVERTER
AGC_AMP
DMSD
DE-MUX
CHR. MUX
FAST-BLANK FIFO
FAST BLANK SWITCH
FOR-MATER
Ext Syn c Mux
SRC for HFB1/ H-Sync
SYNC 2Fh
HV INFO
DLINK-VDDA
DLINK-VDDD
VID1-DTC-VDDA
PLLVDDA
VID1-DTC-VDD3
VDDCO
VDDE
B8
HVSYNC
VIDDEC2
B6
VIDDEC1
B 9
PROTECTION
B7
EHT-INFO
KEYBOARD
HFB_X-RAY-PROT
3380
7383-A
7383-B
+8V
3387
3384
3398
2397
6397
+3V3
7393
6382
7382
6385
6381
6384
3385
+3V3
3354
3353
6353
B 8
SYNC & DEFLECTION PROCESSING
7300-F
ADOC DOP
X-PROT
FLASH
HFB
HVSYNC
B5
1st CONTROL LOOP
2nd CONTROL LOOP
SLOW START/STOP
LOW POWER STARTUP
HIRES. TIMING GEN.
HDROUT
SEL2FH
HOR. TIMEBASE GEN. DTO & CONTROL LOOP
VERT. DRIVER
VERT. SAWTOOTH
EAST-WEST WAVEFORM
VERT. WAVEFORM
ADC
SDAC
EHT
BCL
FBCIN
VDRP
VDRN
EWP
BPA
DOP-DTC-VDDA
DOP-DTC-VDD3
IMEAS-VDDA
SDAC-3V3
SDAC-VDDA
VDDE
3340
3341
3346
VDDCO
VDDE
B4
VREF_DEFL
+5V
7361
3364
3361
3350
LINEDRIVE1
26
EHT-INFO
34
+8V
3372
3388
3387
6368
7365
6367
6365
3373
2361
POR_FLASH
B11
FRAMEDRIVE+
FRAMEDRIVE-
EW_MPIF
EW-DRIVE
31
B4
TILT
35
B7
2455
EHT-INFO
A 8
SIMM CONN
0230
+5V2
40
+5V
45
+8V
43
+3V3
47
VDDE
5601
46
44
A2
FROM BLOCK DIAGRAM STAND-BY SUPPLY
A8
FROM TUNER SIMM CONN.
A3
TO BLOCK DIAGRAM DEFLECTION
A4
A4
A5
TO ROTATION CIRCUITRY
B13
MEMORY INTERFACE
7730
SDRAM
VDDE
1,14,27
3,9,43,49
VDD
VDDQ
FIELD MEMORY & TXT PG
MMI BUS
SA0...SA11
SD0...SD15
B 6
FEATURE BOX
7300
ADOC FEF
VIDDEC2 (YUV)
B5
VIDDEC1 (YUV)
SAMPLE RATE CONVERTER
INPUT SWITCH MATRIX
BLACK STRETCH
BLACK STRETCH
HISTOG. MODIFY
SUB CH.
MAIN CH.
MEASUREMENT BLOCKS
HISTOG. MEAS.
BLACK BAR DET.
BLACK LEVEL DET
NOISE MEAS.
7300
ADOC MBF
7300-I
SUB CH. (YUV)
HOR. COMPRESS
VERT. COMPRESS
NOISE SHAPER
SUB FIFO CACHE
MAIN CH. (YUV)
HOR. COMPRESS
MAIN FIFO CACHE
NOISE SHAPER
DNR
MEMORY BUS DEVICE INTERF.
DTL I/F
MEMORY CTRL/SWI.
UNDI-THER
UNDI-THER
UNDI-THER
SCAN RATE CONVERT
OUTPUT MUX.
Y
UV
MODE CONTROL
DISPLAY CONTROL
7300
ADOC BEF
13.5 / 27 MHz @ 720 ppl
27 / 54 MHz @ 1440 ppl
LUMINANCE SHARPNESS
FILTER
SHARPNESS MEASURE
LTI
DYN. PEAKING
Σ
Y
PANO-RAMA
UV
DCTI
U
V
SKIN TONE CONTROL
BLUE STRETCH
GREEN ENHANCE
COLOUR FEATURES
RGB MATRIX
FRAME PROC.
R
G
B
TO B7
DCTI=Digital Color Transient Imrpovement
Rev 0.3 2-Jul-2003

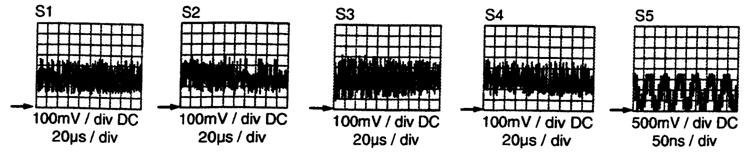
CL 36532058_013.eps
210803

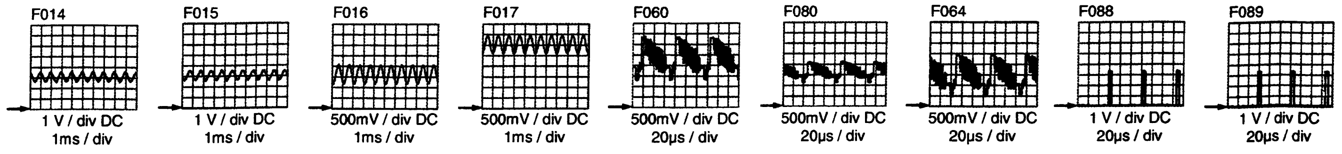
Testpoint Overview SSB

1009	A2	F064	B1	F134	B2	F351	C4	F390	C3	F512	B3	F527	C2	F551	B3	F794	C5	F910	D2	F929	D3	F947	C5	F962	D5	F976	D7	I009	B2	I108	B2	I308	D4	I381	C3	I442	A4
F014	A3	F074	A2	F135	B2	F354	C3	F391	C3	F513	B3	F532	B3	F570	A5	F795	C5	F911	D2	F931	D3	F948	D5	F963	D6	F977	D6	I010	A2	I151	B1	I309	C4	I382	C3	I443	A5
F015	A3	F075	A2	F137	C2	F355	C5	F437	B4	F514	B3	F533	B4	F582	B6	F797	C6	F913	C2	F932	D3	F949	D5	F964	D6	F978	D7	I061	C2	I152	B1	I310	D4	I431	A4	I444	A5
F016	A4	F076	A1	F138	C2	F357	D5	F438	B3	F515	A7	F534	B4	F584	A7	F798	C6	F915	D2	F933	D4	F950	D5	F965	D6	F979	D7	I062	B1	I153	B2	I341	B5	I432	A4	I445	A5
F017	A4	F077	B1	F139	B2	F358	C5	F439	B4	F516	B4	F537	C4	F601	B5	F799	C6	F918	D2	F935	D3	F951	D5	F966	D6	F980	D7	I063	C1	I154	B2	I342	C5	I433	A3	I446	A5
F020	C1	F078	A1	F150	A1	F381	C3	F448	B4	F517	B4	F538	B4	F650	C6	F901	D1	F919	D3	F936	D3	F952	D5	F967	D6	I001	C1	I064	B1	I281	C2	I343	C5	I434	A3	I447	A6
F021	A2	F080	B1	F152	C1	F382	C4	F449	B4	F518	B4	F539	B4	F651	B6	F902	D1	F920	D3	F937	D3	F953	D5	F968	D6	I002	A2	I101	C2	I301	C4	I344	C5	I435	A4	I448	A6
F041	A1	F088	A2	F159	A2	F383	C3	F480	A5	F519	B3	F540	B4	F652	C6	F903	D1	F921	D3	F938	C4	F955	D5	F969	D6	I003	A2	I102	B2	I302	C4	I345	C6	I436	A4	I501	C4
F042	A1	F089	A2	F281	B4	F384	C3	F481	A5	F520	B4	F541	B4	F730	B5	F904	D2	F923	D3	F939	D2	F956	D5	F970	D6	I004	B2	I103	B2	I303	C4	I346	C5	I437	A4	I502	C6
F045	A1	F114	C2	F282	A4	F385	C3	F508	B4	F521	B3	F542	B4	F790	C5	F905	D2	F924	D3	F940	D4	F958	D5	F972	D7	I005	B1	I104	C2	I304	C4	I347	C5	I438	A4	I601	B5
F046	B1	F115	D2	F341	C4	F386	C4	F509	B4	F522	B3	F543	B4	F791	B5	F906	D2	F925	D3	F941	D4	F959	D5	F973	D6	I006	A2	I105	B2	I305	C4	I348	C5	I439	A3	I651	C7
F047	B1	F116	C1	F346	C4	F387	C3	F510	A3	F523	B3	F544	B4	F792	B5	F907	C2	F926	D3	F943	D4	F960	D5	F974	D6	I007	A2	I106	B3	I306	C4	I349	C5	I440	A4		
F060	C2	F132	C1	F348	A1	F389	C3	F511	B3	F524	C4	F550	B3	F793	C5	F909	D2	F928	D3	F944	D4	F961	D6	F975	D7	I008	A2	I107	B2	I307	C4	I350	C5	I441	A4		

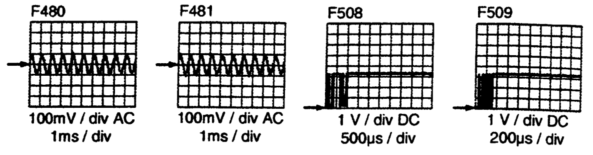




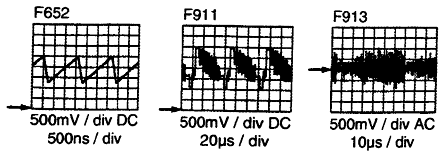


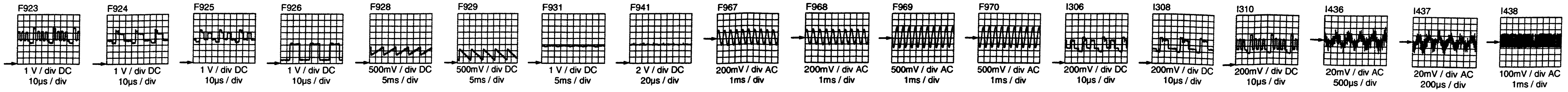


F150: 3V2 DC
F152: 3V2 DC
F281: 3V2 DC
F381: 0V DC
F382: 0V DC
F383: 0V DC



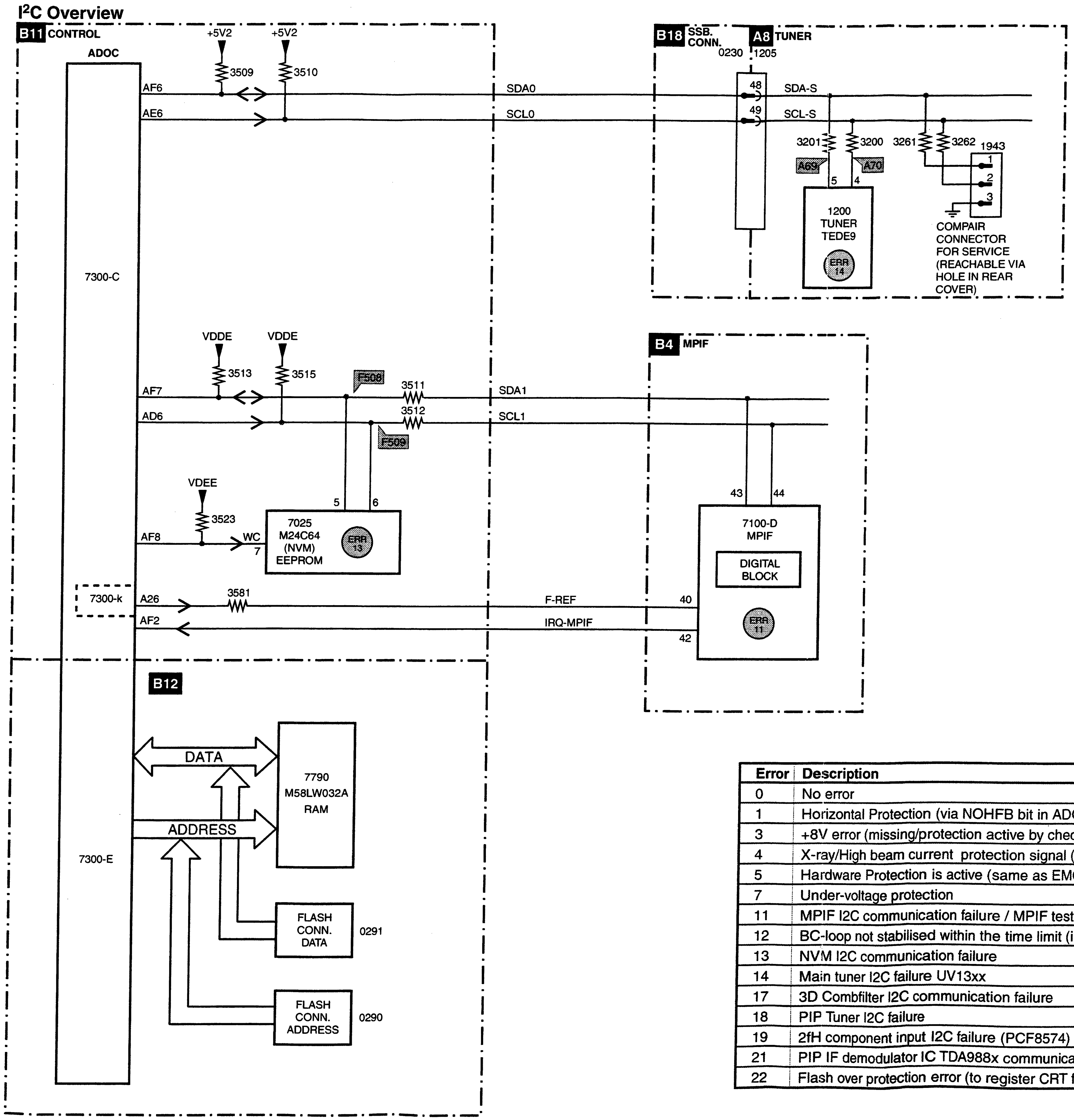
F601: 1V8 DC
F650: 3V2 DC
F651: 1V8 DC





CL 36532058_008.eps
211103

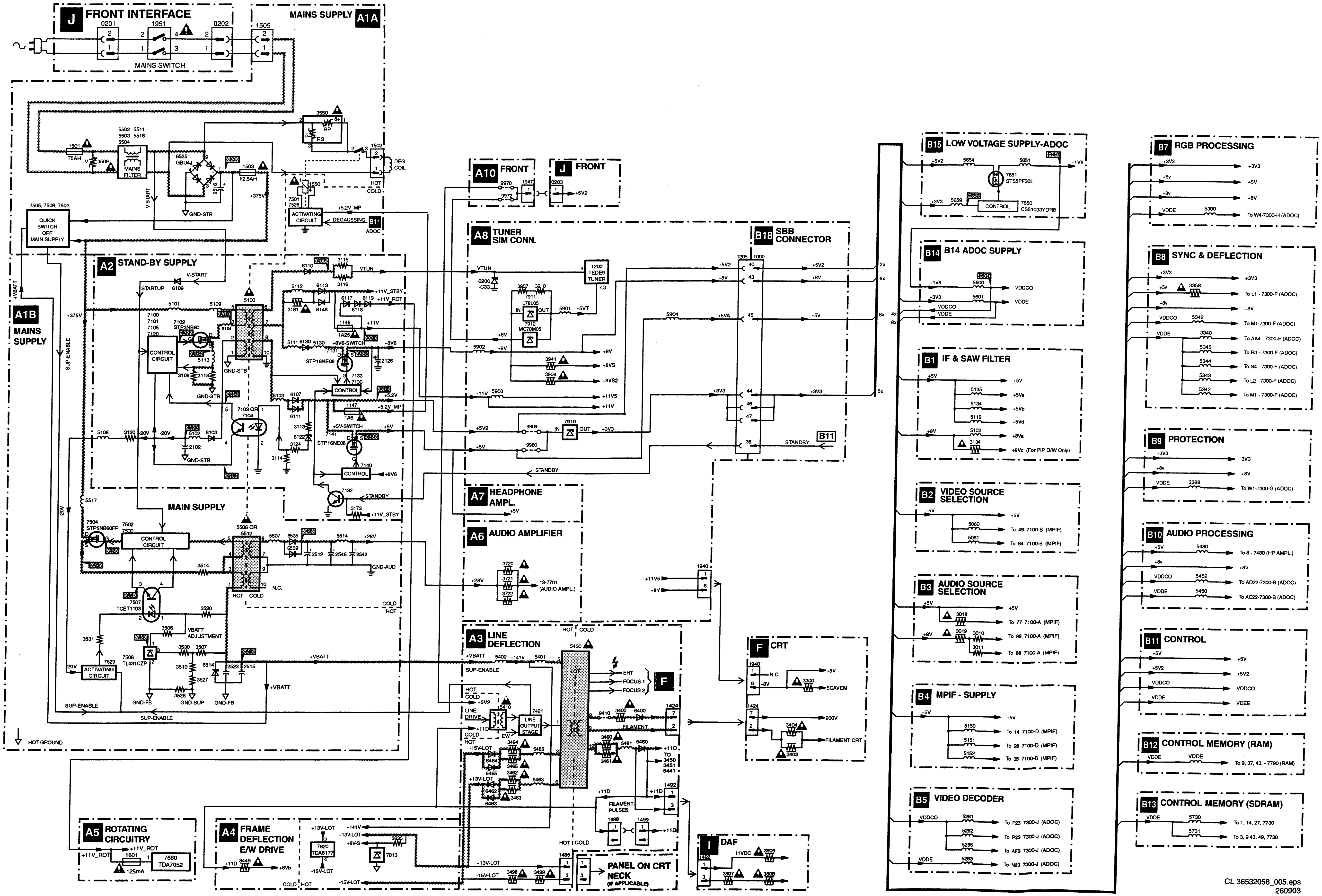
I2C Overview


I²C Overview
B11 CONTROL
ADOC
+5V2
+5V2
3509
3510
AF6
AE6
SDA0
SCL0
7300-C
VDDE
VDDE
3513
3515
F508
3511
3512
F509
AF7
AD6
SDA1
SCL1
VDEE
3523
AF8
WC
7
5
6
7025
M24C64
(NVM)
EEPROM
ERR 13
7300-k
A26
AF2
3581
F-REF
IRQ-MPIF
B12
DATA
ADDRESS
7790
M58LW032A
RAM
7300-E
FLASH CONN. DATA
0291
FLASH CONN. ADDRESS
0290
B18 SSB. CONN.
A8 TUNER
0230
1205
48
49
SDA-S
SCL-S
3201
3200
3261
3262
1943
A69
A70
5
4
1
2
3
1200
TUNER
TEDE9
ERR 14
COMPAIR CONNECTOR FOR SERVICE (REACHABLE VIA HOLE IN REAR COVER)
B4 MPIF
43
44
7100-D
MPIF
DIGITAL BLOCK
40
42
ERR 11

Error	Description
0	No error
1	Horizontal Protection (via NOHFB bit in ADOC)
3	+8V error (missing/protection active by checking MPIF ASUP bit))
4	X-ray/High beam current protection signal (via XPROT bit in ADOC)
5	Hardware Protection is active (same as EMG)
7	Under-voltage protection
11	MPIF I2C communication failure / MPIF test failed
12	BC-loop not stabilised within the time limit (i.e. after timer is expired)
13	NVM I2C communication failure
14	Main tuner I2C failure UV13xx
17	3D Combfilter I2C communication failure
18	PIP Tuner I2C failure
19	2fH component input I2C failure (PCF8574)
21	PIP IF demodulator IC TDA988x communication failed (only for PIP/DW Sets)
22	Flash over protection error (to register CRT flash-overs, via FPR bit in ADOC)

CL 36532058_004.eps
030903

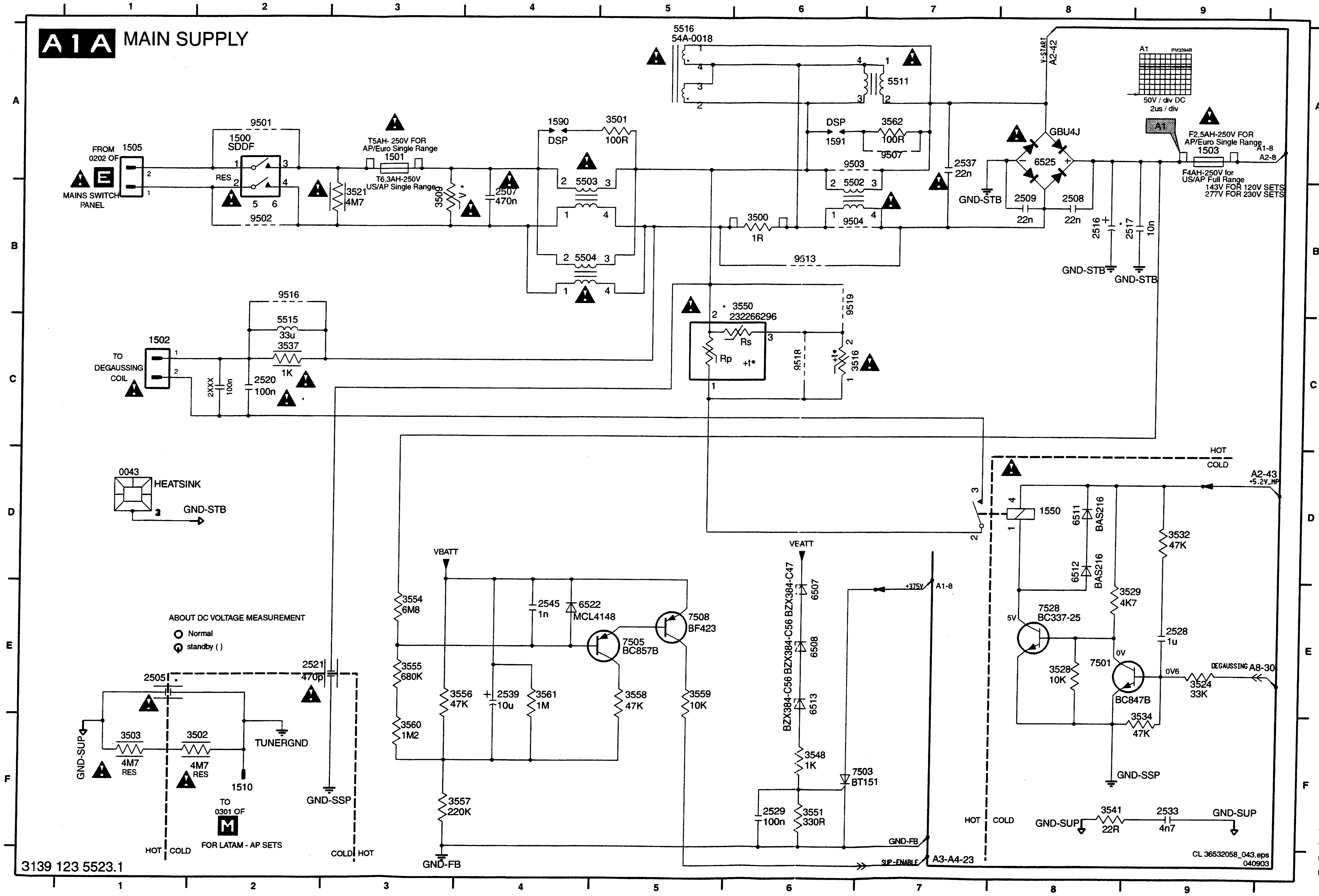
Supply Lines Overview


J FRONT INTERFACE
0201
1951
0202
MAINS SWITCH
MAINS SUPPLY A1A
1505
A1B MAINS SUPPLY
T5AH
MAINS FILTER
6525 GBU4J
F2.5AH
3550
RP
RS
1502
DEG. COIL
HOT
COLD
ACTIVATING CIRCUIT
+5.2V_MP
DEGAUSSING B11
ADOC
QUICK SWITCH OFF MAIN SUPPLY
7505, 7506, 7503
GND-STB
V-START
+375V
A2 STAND-BY SUPPLY
V-START
STARTUP 6109
VTUN
+11V_STBY
+11V_ROT
+11V
+8V6-SWITCH
+8V6
CONTROL CIRCUIT
STP3NB60
STP16NE06
CONTROL
+5.2V
+5.2V_MP
+5V-SWITCH
+5V
STANDBY
+11V_STBY
MAIN SUPPLY
STP5NB60FP
CONTROL CIRCUIT
5506 OR 5512
+28V
GND-AUD
N.C.
HOT COLD
7507 TCET1103
VBATT ADJUSTMENT
7506 TL431CZP
ACTIVATING CIRCUIT
+VBATT
GND-FB
GND-SUP
SUP-ENABLE
HOT GROUND
A10 FRONT
J FRONT
+5V2
A8 TUNER SIM CONN.
1200 TEDE9 TUNER
L78L05
MC78M05
+5VT
+8V
+8VS
+8VS2
+11V5
+3V3
B18 SBB CONNECTOR
+5VA
STANDBY
B11
A7 HEADPHONE AMPL.
A6 AUDIO AMPLIFIER
13-7701 (AUDIO AMPL.)
A3 LINE DEFLECTION
+141V
LOT
EHT
FOCUS 1
FOCUS 2
F
LINE DRIVE
LINE OUTPUT STAGE
EW
-15V-LOT
+13V-LOT
FILAMENT
FILAMENT PULSES
+11D
A5 ROTATING CIRCUITRY
+11V_ROT
7680 TDA7052
125mA
A4 FRAME DEFLECTION E/W DRIVE
7620 TDA8177
PANEL ON CRT NECK (IF APPLICABLE)
F CRT
SCAVEM
200V
FILAMENT CRT
I DAF
11VDC
B15 LOW VOLTAGE SUPPLY-ADOC
7651 STS5PF30L
CONTROL
7650 CS51033YDR8
+1V8
B14 B14 ADOC SUPPLY
VDDCO
VDDE
B1 IF & SAW FILTER
+5Va
+5Vb
+5Vd
+8Va
+8Vc (For PIP D/W Only)
B2 VIDEO SOURCE SELECTION
To 49 7100-B (MPIF)
To 64 7100-B (MPIF)
B3 AUDIO SOURCE SELECTION
To 77 7100-A (MPIF)
To 98 7100-A (MPIF)
To 88 7100-A (MPIF)
B4 MPIF - SUPPLY
To 14 7100-D (MPIF)
To 28 7100-D (MPIF)
To 35 7100-D (MPIF)
B5 VIDEO DECODER
To F23 7300-J (ADOC)
To P23 7300-J (ADOC)
To AF3 7300-J (ADOC)
To N23 7300-J (ADOC)
B7 RGB PROCESSING
To W4-7300-H (ADOC)
B8 SYNC & DEFLECTION
To L1 - 7300-F (ADOC)
To M1-7300-F (ADOC)
To AA4 - 7300-F (ADOC)
To R3 - 7300-F (ADOC)
To N4 - 7300-F (ADOC)
To L2 - 7300-F (ADOC)
To M1 - 7300-F (ADOC)
B9 PROTECTION
To W1-7300-G (ADOC)
B10 AUDIO PROCESSING
To 8 - 7480 (HP AMPL.)
To AD22-7300-B (ADOC)
To AC22-7300-B (ADOC)
B11 CONTROL
B12 CONTROL MEMORY (RAM)
To 9, 37, 43, - 7790 (RAM)
B13 CONTROL MEMORY (SDRAM)
To 1, 14, 27, 7730
To 3, 9 43, 49, 7730

CL 36532058_005.eps
260903

7. Circuit Diagrams and PWB Layouts

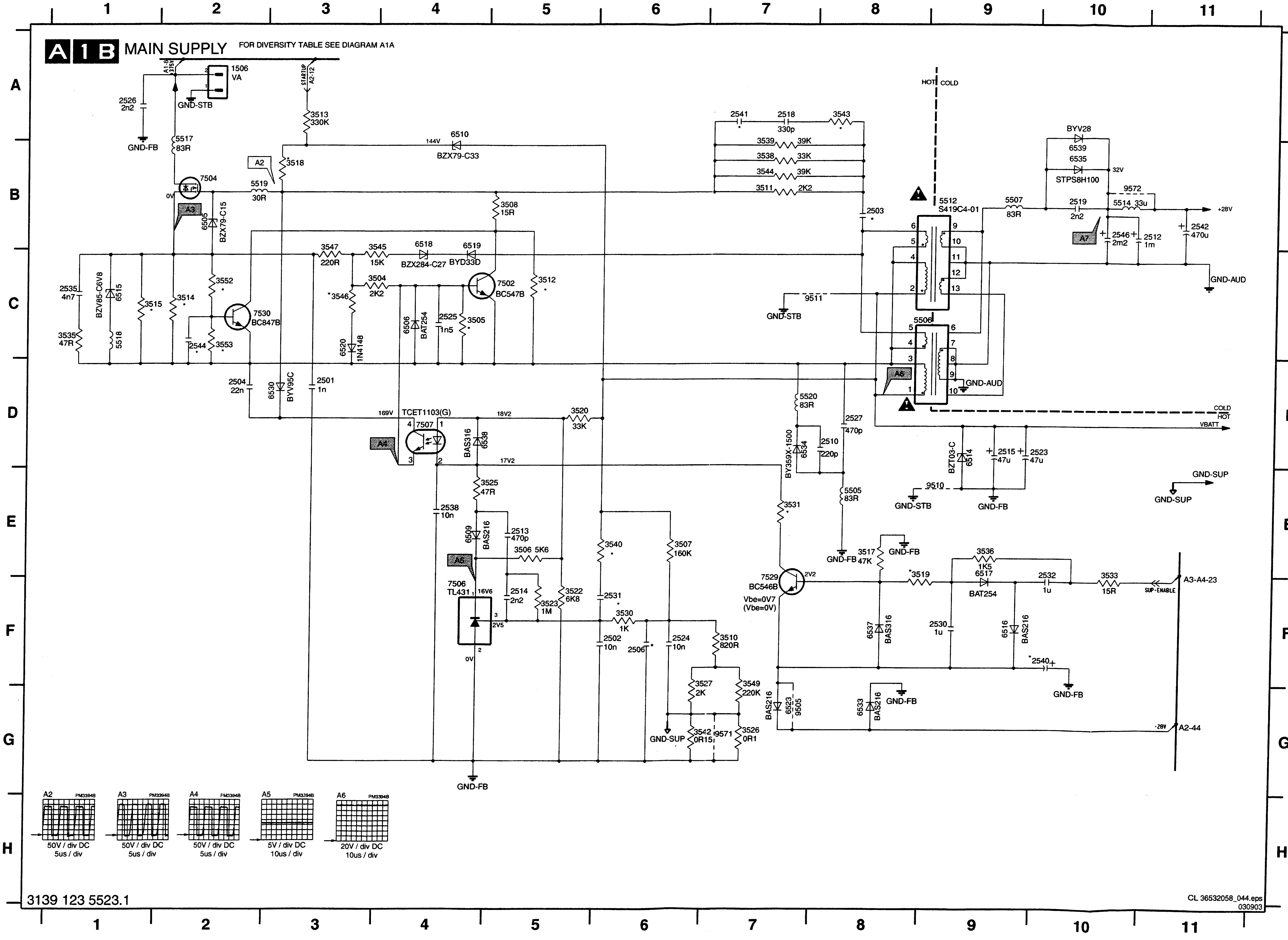
Large Signal Panel: Main Supply


A1A MAIN SUPPLY
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
FROM 0202 OF
1505
E
MAINS SWITCH PANEL
9501
1500 SDDF
RES
9502
T5AH- 250V FOR AP/Euro Single Range
1501
T6,3AH-250V US/AP Single Range
3521 4M7
3509
2507 470n
1590 DSP
3501 100R
5503
5504
5516 54A-0018
5511
DSP 1591
3562 100R
9507
9503
5502
9504
3500 1R
9513
2537 22n
GBU4J
6525
2509 22n
2508 22n
GND-STB
2516
2517
10n
V-START A2-42
A1
50V / div DC 2us / div
F2,5AH-250V FOR AP/Euro Single Range
1503
F4AH-250V for US/AP Full Range
143V FOR 120V SETS
277V FOR 230V SETS
A1-8
A2-8
TO DEGAUSSING COIL
1502
9516
5515 33u
3537 1K
2XXX 100n
2520 100n
3550 232266296
Rs
Rp
9518
9519
3516
0043 HEATSINK
GND-STB
HOT
COLD
A2-43 +5.2V_MP
1550
6511 BAS216
6512 BAS216
3532 47K
3529 4K7
7528 BC337-25
5V
2528 1u
3528 10K
7501
0V
BC847B
0V6
DEGAUSSING A8-30
3524 33K
3534 47K
GND-SSP
VBATT
3554 6M8
3555 680K
3560 1M2
3556 47K
2539 10u
3561 1M
2545 1n
6522 MCL4148
7505 BC857B
7508 BF423
3558 47K
3559 10K
3557 220K
GND-FB
VEATT
BZX384-C56 BZX384-C56 BZX384-C47
6507
6508
6513
3548 1K
7503 BT151
2529 100n
3551 330R
+375V
A1-8
SUP-ENABLE
A3-A4-23
GND-SUP
3541 22R
2533 4n7
ABOUT DC VOLTAGE MEASUREMENT
Normal
standby ( )
2505
2521 470p
3503 4M7 RES
3502 4M7 RES
TUNERGND
1510
TO 0301 OF
M
FOR LATAM - AP SETS
GND-SSP
HOT
COLD
3139 123 5523.1
CL 36532058_043.eps 040903

0043	D1
1500	A2
1501	A3
1502	C1
1503	A9
1505	A1
1510	F2
1550	D8
1590	A4
1591	A6
2505	E1
2507	B4
2508	B8
2509	B8
2516	B8
2517	B9
2520	C2
2521	E2
2528	E9
2529	F6
2533	F9
2537	A7
2539	E4
2545	E4
2547	C2
3500	B6
3501	A5
3502	F2
3503	F1
3509	B3
3516	C6
3521	B3
3524	E9
3528	E8
3529	E9
3532	D9
3534	F9
3537	C2
3541	F8
3548	F6
3550	B6
3551	F6
3554	E3
3555	E3
3556	E4
3557	F4
3558	E5
3559	E5
3560	F3
3561	E4
3562	A7
5502	B6
5503	B4
5504	B4
5511	A7
5515	C2
5516	A5
6507	E6
6508	E6
6511	D8
6512	D8
6513	E6
6522	E4
6525	A8
7501	E8
7503	F7
7505	E5
7508	E5
7528	E8
9501	A2
9502	B2
9503	A6
9504	B6
9507	A7
9513	B6
9516	B2
9518	C6
9519	B6

Item	Remarks	Europe	NAFTA	China	AP single range	AP full range	DESCRIPTION
1501		—	V	—	—	V	FUSE 5X20 HT 6A3 250V IEC B
1501		V	—	V	V	—	FUSE 5X20 HT 5A 250V IEC B
1503		—	V	—	—	V	FUSE 5X20 F 4A 250V IEC B
1503		V	—	V	V	—	FUSE 5X20 F 2A5 250V IEC B
1591		V	—	V	—	V	SURGE PROTECT DSP-501N-A21F A
2100	in A2	—	—	—	V	—	CERSAF KX 250V S 470P PM10 B
2100	in A2	V	V	V	—	V	CERSAF KX 250V S 1N PM20 B
2503		V	—	V	V	—	CAP MPOL 100V S 33N PM10 A
2503		—	V	—	—	V	CAP MPOL 100V S 39N PM5 A
2505		V	V	—	V	—	CERSAF KX 250V S 470P PM10 B
2505		—	—	V	—	V	CERSAF KX 250V S 1N PM20 B
2506		—	V	—	—	V	CAP POL 50V S 47N PM10 COL A
2515		V	—	—	—	—	ELCAP JA 200V S 47U P50M10 B
2515		—	V	—	—	—	ELCAP JA 200V S 47U P50M10 B
2515		—	—	V	—	—	ELCAP JA 200V S 47U P50M10 B
2515		—	—	—	V	V	ELCAP JA 200V S 47U P50M10 B
2516		—	—	—	—	V	ELCAP USR 400V S 470U PM20 B
2516		—	—	V	—	—	ELCAP LQ 450V S 220U PM20 B
2516		—	V	—	—	—	ELCAP USR 200V S 680U PM20 B
2516		V	—	—	V	—	ELCAP 057 400V S 220U PM20 B
2517		—	—	—	—	V	CAP MPOL 400V S 10N PM10 A
2518		V	—	V	V	—	CER2 DC B 500V S 100P COL A
2518		—	V	—	—	V	CER2 DC B 500V S 330P COL A
2521		—	V	—	—	V	CERSAF KX 250V S 1N PM20 B
2524		V	—	V	V	—	CER2 0603 X7R 50V 10N COL
2529		—	V	—	—	V	CER2 0603 Y5V 25V 100N COL
2531		V	—	V	V	—	CER2 DC B 500V S 1N COL A
2531		—	V	—	—	V	CER2 DC B 500V S 1N5 COL A
2539		—	V	—	—	V	ELCAP 5MM 35V 10U PM20 COL A
2540		V	—	V	V	—	ELCAP 50V S 1U PM20 COL A
2540		—	V	—	—	V	ELCAP 50V S 10U PM20 COL A
2541		V	—	V	V	—	CER2 DC B 500V S 100P COL A
2541		—	V	—	—	V	CER2 DC B 500V S 330P COL A
2544		—	V	—	—	V	CER2 0603 X7R 50V 1N COL
2544		V	—	V	V	—	CER2 0603 X7R 50V 2N2 COL
3500		—	V	—	V	V	RST WW 10W RMW10L S 0R56 PM5 B
3502		—	V	—	—	—	RST MGL VR37 A 4M7 PM5 A
3503		—	V	—	—	—	RST MGL VR37 A 4M7 PM5 A
3505		—	V	—	—	V	RST CRB 1/6W A 150K PM5 COL A
3505		V	—	V	V	—	RST CRB 1/6W A 22K PM5 COL A
3509		V	—	V	V	V	VDR DC 1MA/612V S MAX 1120V B
3509		—	V	—	—	—	VDR DC 1MA/423V S MAX 800V B
3512		V	—	V	V	—	RST SM 0603 220K PM5 COL
3512		—	V	—	—	V	RST SM 0603 330K PM5 COL
3514		V	—	V	V	—	RST MFLM PR01 S 0R39 PM5 B
3514		—	V	—	—	V	RST POW 1W S 0R22 PM5 COL B
3515		V	—	V	V	—	RST MFLM PR01 S 0R39 PM5 B
3515		—	V	—	—	V	RST POW 1W S 0R22 PM5 COL B
3518		—	V	—	—	V	RST MGL VR25 A 330K PM5 A
3518		V	—	V	V	—	RST CRB 1/6W A 100K PM5 COL A
3519		V	—	V	V	—	RST SM 0603 1K PM5 COL
3519		—	V	—	—	V	RST SM 0603 1K2 PM5 COL
3531		—	V	—	—	V	RST SM 0805 4K7 PM5 COL R
3531		V	—	V	V	—	RST SM 0805 6K8 PM5 COL R
3538		—	V	—	—	V	RST SM 0805 33K PM5 COL R
3539		—	V	—	—	V	RST SM 0805 39K PM5 COL R
3540		—	V	—	—	V	RST CRB 1/6W A 10K PM5 COL A
3540		V	—	V	V	—	RST CRB 1/6W A 33K PM5 COL A
3543		—	V	—	—	V	RST CRB 1/6W A 1K PM5 COL A

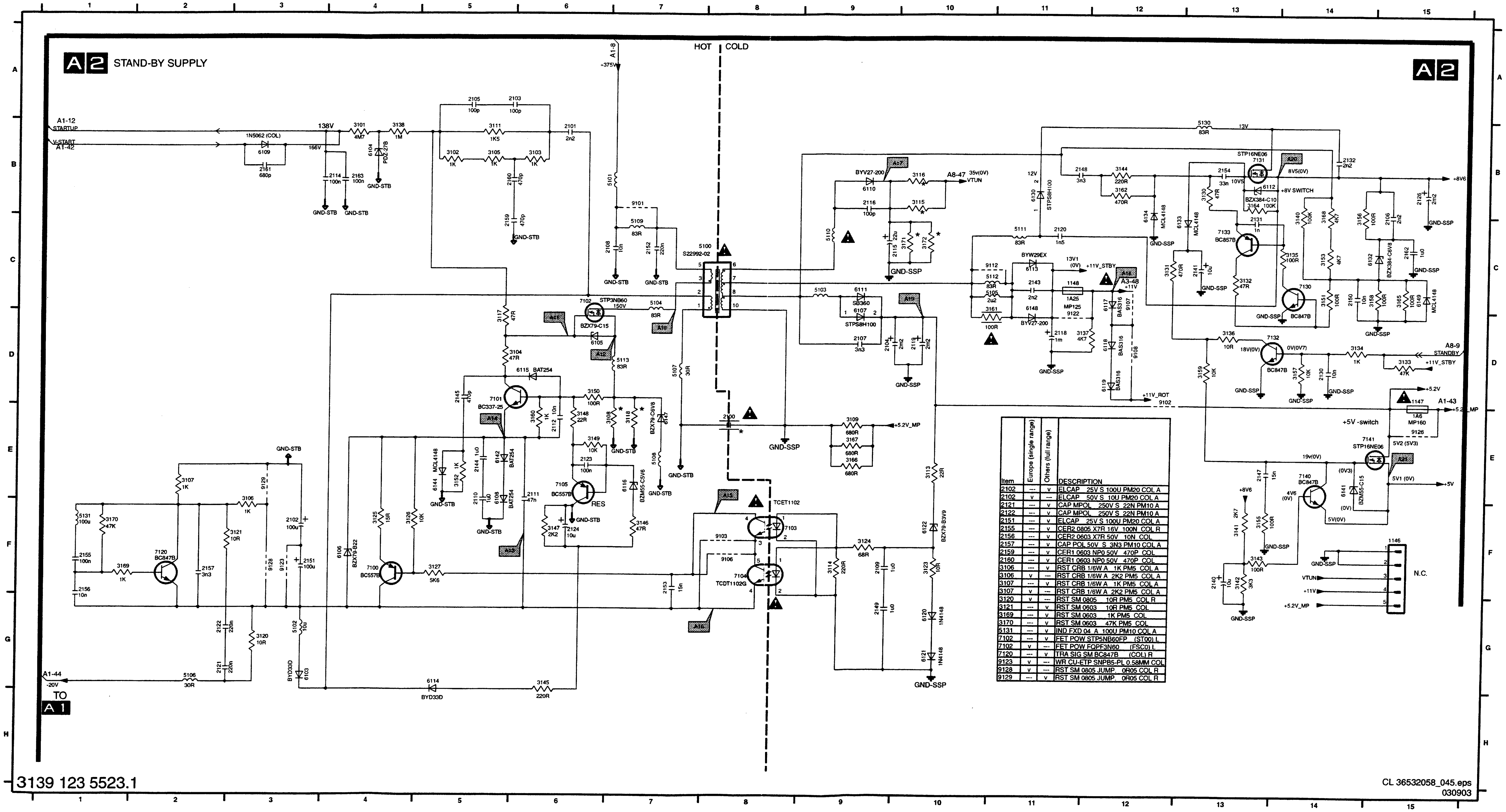
Large Signal Panel: Main Supply


A1B MAIN SUPPLY
FOR DIVERSITY TABLE SEE DIAGRAM A1A
1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H
1506 VA
2526 2n2
GND-FB
GND-STB
5517 83R
3513 330K
STARTUP A2-12
A1-8 315V
6510 BZX79-C33
144V
A2
3518
5519 30R
7504
0V
A3
6505 BZX79-C15
3508 15R
3547 220R
3545 15K
6518 BZX284-C27
6519 BYD33D
3504 2K2
3546
7502 BC547B
3512
2535 4n7
3535 47R
BZV85-C6V8
6515
5518
3515
3514
3552
7530 BC847B
2544
3553
6520 1N4148
6506 BAT254
2525 1n5
3505
2504 22n
6530 BYV95C
2501 1n
169V
TCET1103(G)
7507
A4
BAS316 6538
18V2
17V2
3520 33K
3525 47R
2538 10n
6509 BAS216
2513 470p
3506 5K6
A5
7506 TL431
16V6
2514 2n2
3523 1M
3522 6K8
2V5
3540
3507 160K
2531
3530 1K
2502 10n
2506
2524 10n
3510 820R
3527 2K
3549 220K
GND-SUP
3542 0R15
9571
3526 0R1
2541
2518 330p
3543
3539 39K
3538 33K
3544 39K
3511 2K2
2503
HOT COLD
5512 S419C4-01
9511
5506
A6
GND-AUD
5520 83R
2527 470p
BY359X-1500
6534
2510 220p
5505 83R
3531
3517 47K
7529 BC546B
2V2
Vbe=0V7 (Vbe=0V)
6537 BAS316
BAS216 6523
9505
6533 BAS216
5507 83R
2519 2n2
BYV28 6539
6535 STPS8H100
32V
9572
5514 33u
+28V
A7
2546 2m2
2512 1m
2542 470u
COLD HOT
VBATT
BZT03-C 6514
2515 47u
2523 47u
9510
GND-SUP
3536 1K5
6517 BAT254
3519
2532 1u
3533 15R
SUP-ENABLE
A3-A4-23
2530 1u
6516 BAS216
2540
-28V
A2-44
A2 50V / div DC 5us / div
A3 50V / div DC 5us / div
A4 50V / div DC 5us / div
A5 5V / div DC 10us / div
A6 20V / div DC 10us / div
PM3394B
3139 123 5523.1
CL 36532058_044.eps 030903

1506	A2
2501	D3
2502	F6
2503	B8
2504	D2
2506	F6
2510	D8
2512	B11
2513	E5
2514	F5
2515	D9
2518	A7
2519	B10
2523	D10
2524	F6
2525	C4
2526	A1
2527	D8
2530	F9
2531	F6
2532	F10
2535	C1
2538	E4
2540	F10
2541	A7
2542	B11
2544	C2
2546	B10
3504	C3
3505	C4
3506	E5
3507	E6
3508	B5
3510	F7
3511	B7
3512	C5
3513	A3
3514	C2
3515	C1
3517	E8
3518	B3
3519	F8
3520	D5
3522	F5
3523	F5
3525	E5
3526	G7
3527	F7
3530	F6
3531	E7
3533	F10
3535	C1
3536	E9
3538	B7
3539	B7
3540	E6
3542	G7
3543	A8
3544	B7
3545	C3
3546	C3
3547	C3
3549	F7
3552	C2
3553	C2
5505	E8
5506	C8
5507	B9
5512	B9
5514	B10
5517	A2
5518	C1
5519	B2
5520	D7
6505	B2
6506	C4
6509	E4
6510	A4
6514	D9
6515	C1
6516	F9
6517	E9
6518	B4
6519	B4
6520	C3
6523	G7
6530	D3
6533	G8
6534	D7
6535	B10
6537	F8
6538	D4
6539	B10
7502	C5
7504	B2
7506	F4
7507	D4
7529	F7
7530	C2
9505	G7
9510	E9
9511	C7
9571	G7
9572	B10

Large Signal Panel: Standby Supply

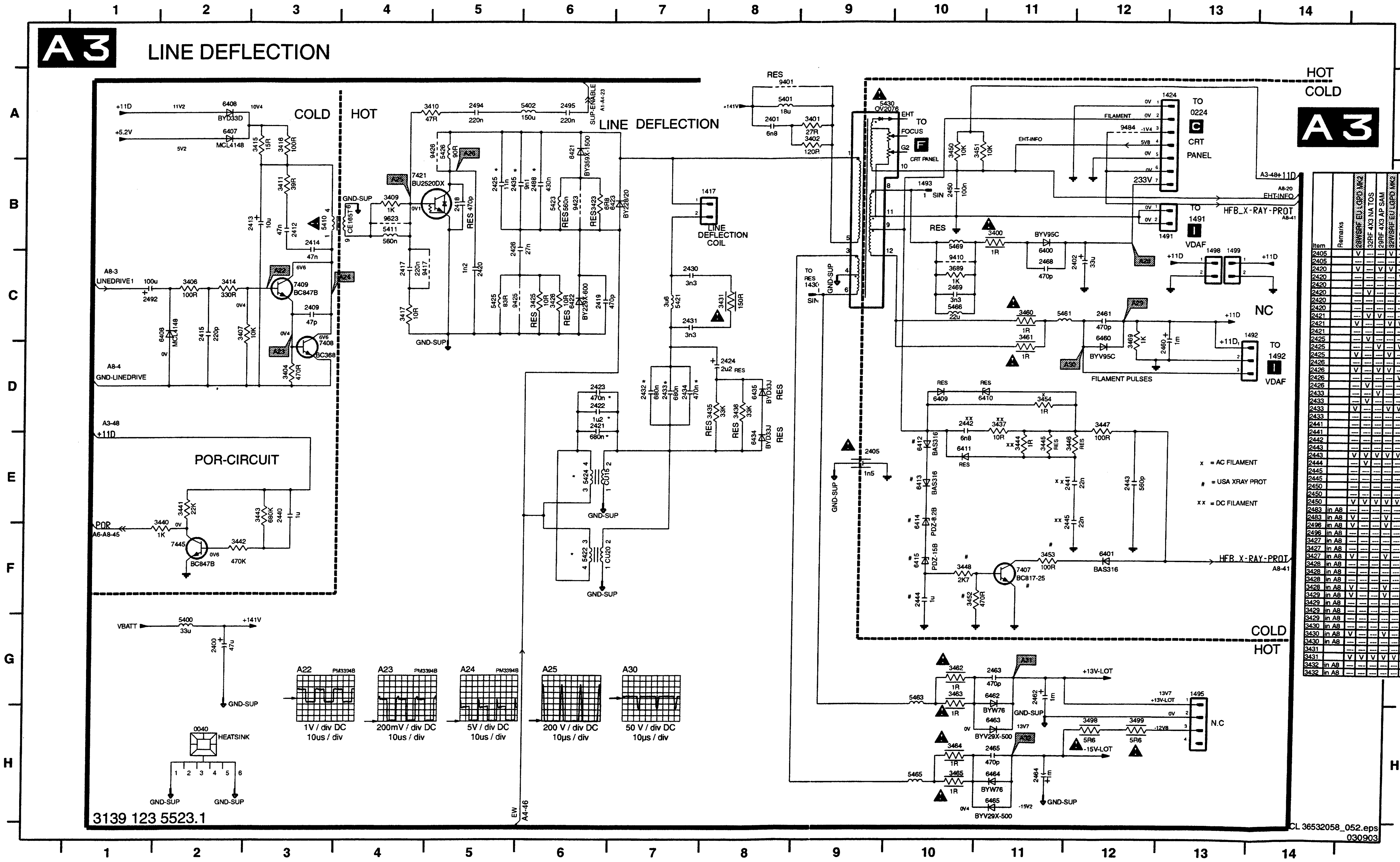
1146 F15
1147 D15
1148 C11
2100 E8
2101 B6
2102 F3
2103 A5
2104 D9
2105 A5
2106 B15
2107 D9
2108 C6
2109 F9
2110 E5
2111 E6
2112 E6
2114 B4
2115 C9
2116 B9
2118 D11
2119 D10
2120 C11
2121 G2
2122 G2
2123 E6
2124 F6
2126 B15
2130 D14
2131 C13
2132 B14
2140 F13
2141 C13
2143 C11
2144 E5
2145 D5
2147 E13
2148 B11
2149 G9
2150 C14
2151 F3
2152 C7
2153 F7
2154 B13
2155 F1
2156 F1
2157 F2
2159 C5
2160 B5
2161 B3
2162 C15
2163 B4
3101 B4
3102 B5
3103 B6
3104 D6
3105 B5
3106 F3
3107 E2
3108 E7
3109 E9
3111 B5
3113 E10
3114 F9
3115 B10
3116 B10
3117 D5
3118 E7
3120 G3
3121 F3
3123 F10
3124 F9
3125 F4
3126 F4
3127 F5
3130 B13
3131 C12
3132 C13
3133 D15
3134 D14
3135 C14
3136 D13
3137 D11
3138 B4
3140 C14
3141 F13
3142 F13
3143 F13
3144 B12
3145 G6
3146 F7
3147 F6
3148 E6
3149 E6
3150 D6
3151 C14
3152 E5
3153 C14
3155 F13
3156 C14
3157 D14
3158 C15
3159 D13
3160 E6
3161 D10
3162 B12
3164 B13
3165 C15
3166 E9
3167 E9
3168 B14
3169 F1
3170 F1
3171 C10
3172 C10
5100 C7
5101 B6
5102 G3
5103 C9
5104 C7
5105 C10
5106 G2
5107 D7
5108 E7
5109 C7
5110 C9
5111 C11
5112 C10
5113 D7
5130 B13
5131 F1
6103 G3
6104 B4
6105 D6
6106 F4
6107 D9
6108 E5
6109 B3
6110 B9
6111 C9
6112 B13
6113 C11
6114 G5
6115 D6
6116 E7
6117 C12
6118 D12
6119 D12
6120 G10
6121 G10
6122 F10
6130 B11
6132 C14
6133 C12
6134 B12
6141 E14
6142 E5
6144 E5
6147 E7
6148 C11
6149 C15
7100 F4
7101 D5
7102 C6
7103 F8
7104 F8
7105 E6
7120 F2
7130 C14
7131 B13
7132 D14
7133 C13
7140 E14
7141 E14
9101 B7
9102 D12
9103 F8
9106 F8
9107 C12
9108 D12
9112 C10
9122 D11
9123 F3
9126 E15
9128 F3
9129 E3


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
A
B
C
D
E
F
G
H
A2 STAND-BY SUPPLY
A2
HOT
COLD
A1-8
-375V
A1-12
STARTUP
V-START
A1-42
138V
166V
1N5062 (COL)
6109
2161
680p
2114
100n
2163
100n
GND-STB
2105
100p
2103
100p
3101
4M7
3138
1M
3111
1K5
2101
2n2
3102
1K
3105
1K
3103
1K
6104
PDZ-27B
2160
470p
2159
470p
5101
9101
5109
83R
2108
10n
2152
22n
5100
S22992-02
3117
47R
7102
STP3NB60
150V
5104
83R
BZX79-C15
6105
5113
83R
3104
47R
6115
BAT254
7101
BC337-25
2145
470p
3150
100R
3160
1K
2112
10n
3148
22R
3108
3118
BZX79-C6V8
6147
3149
10K
2123
100n
7105
BC557B
RES
6116
BZM55-C5V6
5108
3146
47R
3147
2K2
2124
10u
6144
MCL4148
3152
1K
2144
1u0
6142
BAT254
2110
1n0
6108
BAT254
2111
47n
3125
15R
3126
10K
6106
BZX79-B22
7100
BC557B
3127
5K6
3107
1K
3106
1K
9129
5131
100u
3170
47K
2155
100n
3169
1K
7120
BC847B
2157
3n3
2156
10n
3121
10R
9128
2102
100u
2151
100u
2122
220n
2121
220n
3120
10R
5102
10u
BYD33D
6103
A1-44
-20V
5106
30R
TO
A1
6114
BYD33D
3145
220R
5107
30R
2100
2153
15n
9103
9106
7103
7104
TCET1102
TCDT1102G
3109
680R
3167
680R
3166
680R
+5.2V_MP
GND-SSP
BYV27-200
6110
3116
A8-47
35V(0V)
VTUN
2116
100p
3115
5110
2115
22u
3171
3172
5103
6111
SB360
6107
STPS8H100
2107
3n3
2104
2n2
2119
2n2
3124
68R
3114
220R
2109
1n0
2149
1n0
3113
22R
6122
BZX79-B3V9
3123
10R
6120
1N4148
6121
1N4148
12V
6130
STPS8H100
5111
83R
2120
1n5
9112
5112
83R
5105
2u2
3161
100R
BYW29EX
6113
13V1
(0V)
+11V_STBY
2143
2n2
6148
1148
1A25
MP125
9122
BYV27-200
A3-48
+11V
6117
BAS316
9107
2118
1m
3137
4K7
6118
BAS316
9108
6119
BAS316
+11V_ROT
9102
5130
83R
13V
2148
3n3
3144
220R
3162
470R
6134
MCL4148
6133
MCL4148
3130
47R
2154
33n
10V5
STP16NE06
7131
8V5(0V)
6112
BZX384-C10
+8V SWITCH
3164
100K
2131
1n
7133
BC857B
3135
100R
3131
470R
2141
1u0
3132
47R
7130
BC847B
2132
2n2
+8V6
3140
100K
3168
4K7
3156
100R
2106
2n2
2126
2n2
3153
4K7
6132
BZX384-C6V8
2162
1u0
3151
100R
2150
10n
3158
100R
3165
100R
6149
MCL4148
3136
10R
18V(0V)
7132
BC847B
0V(0V7)
3134
1K
3133
47K
A8-9
STANDBY
+11V_STBY
3159
10K
3157
10K
2130
10n
+5.2V
1147
1A6
MP160
A1-43
+5.2V_MP
+5V -switch
9126
7141
STP16NE06
5V2 (5V3)
19V(0V)
(0V3)
5V1 (0V)
+5V
2147
15n
+8V6
4V6
(0V)
7140
BC847B
6141
BZM55-C15
(0V)
5V(0V)
3141
2K7
3155
100R
3143
100R
2140
10u
3142
3K3
1146
N.C.
VTUN
+11V
+5.2V_MP
3139 123 5523.1
CL 36532058_045.eps
030903

Item	Europe (single range)	Others (full range)	DESCRIPTION
2102	---	v	ELCAP 25V S 100U PM20 COL A
2102	v	---	ELCAP 50V S 10U PM20 COL A
2121	---	v	CAP MPOL 250V S 22N PM10 A
2122	---	v	CAP MPOL 250V S 22N PM10 A
2151	---	v	ELCAP 25V S 100U PM20 COL A
2155	---	v	CER2 0805 X7R 16V 100N COL R
2156	---	v	CER2 0603 X7R 50V 10N COL
2157	---	v	CAP POL 50V S 3N3 PM10 COL A
2159	---	v	CER1 0603 NP0 50V 470P COL
2160	---	v	CER1 0603 NP0 50V 470P COL
3106	---	v	RST CRB 1/6W A 1K PM5 COL A
3106	v	---	RST CRB 1/6W A 2K2 PM5 COL A
3107	---	v	RST CRB 1/6W A 1K PM5 COL A
3107	v	---	RST CRB 1/6W A 2K2 PM5 COL A
3120	v	---	RST SM 0805 10R PM5 COL R
3121	---	v	RST SM 0603 10R PM5 COL
3169	---	v	RST SM 0603 1K PM5 COL
3170	---	v	RST SM 0603 47K PM5 COL
5131	---	v	IND FXD 04 A 100U PM10 COL A
7102	---	v	FET POW STP5NB60FP (ST00) L
7102	v	---	FET POW FQPF3N60 (FSC0) L
7120	---	v	TRA SIG SM BC847B (COL) R
9123	v	---	WR CU-ETP SNPB5-PL 0.58MM COL
9128	v	---	RST SM 0805 JUMP. 0R05 COL R
9129	---	v	RST SM 0805 JUMP. 0R05 COL R

Large Signal Panel: Line Deflection

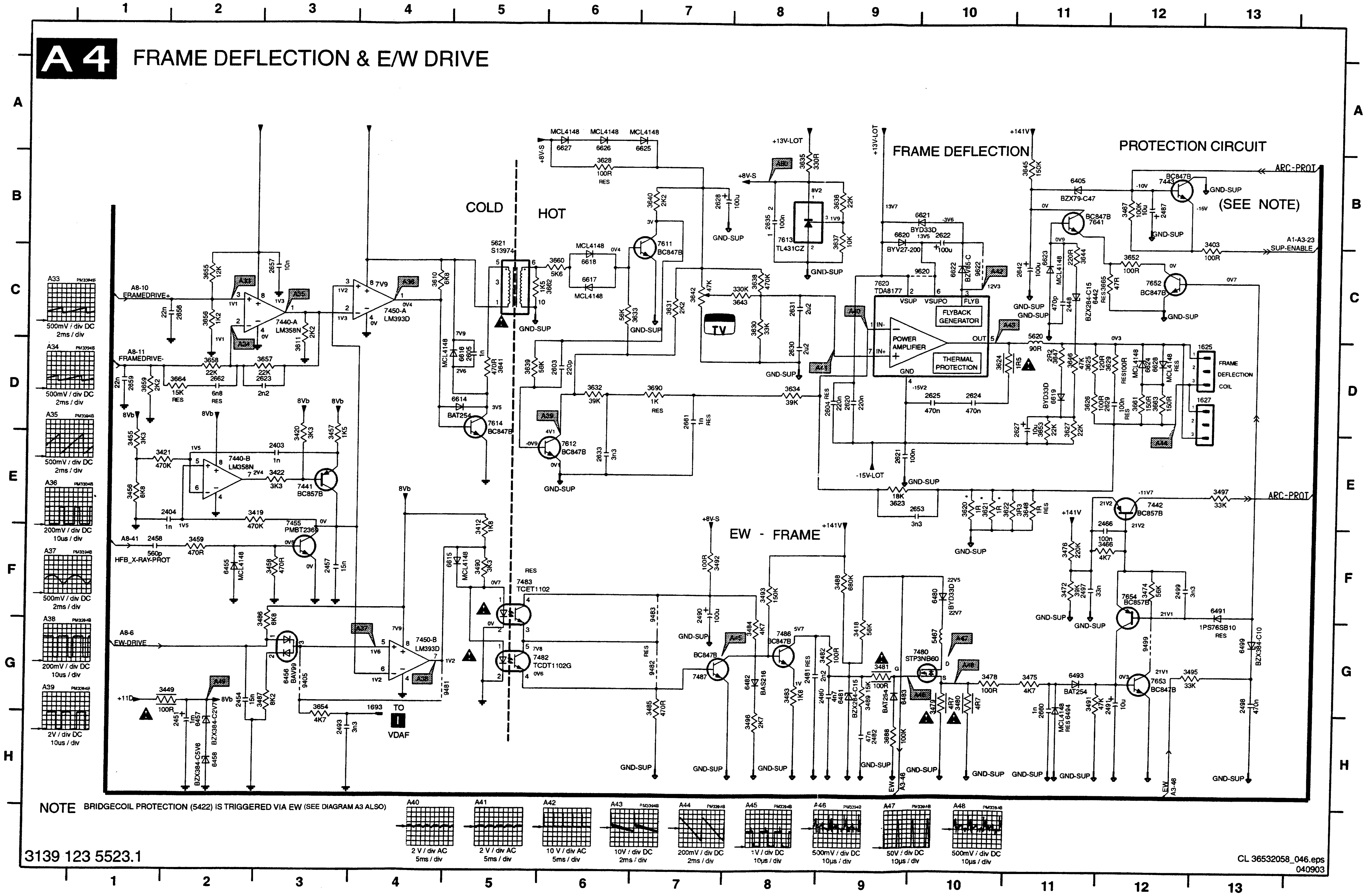
0040	H2
1417	B7
1424	A12
1430	C9
1491	B13
1492	C13
1493	B10
1495	G13
1498	C13
1499	C13
2400	G2
2401	A8
2402	C12
2405	E9
2409	C3
2412	B3
2413	B3
2414	B3
2415	C2
2417	C4
2418	B5
2419	C6
2420	C5
2421	D6
2422	D6
2423	D6
2424	D8
2425	B5
2426	B5
2430	C7
2431	C7
2432	D7
2433	D7
2434	D7
2435	B5
2440	E3
2441	E12
2442	D10
2443	E12
2444	F10
2445	E12
2450	B10
2460	D13
2461	C12
2462	G11
2463	G11
2464	H11
2465	H11
2468	C11
2469	C10
2488	B6
2492	C1
2494	A5
2495	A6
3400	B11
3401	A9
3402	A9
3404	D3
3406	C2
3407	C2
3409	B4
3410	A4
3411	B3
3414	C2
3415	A3
3416	A3
3417	C4
3423	B6
3425	C6
3426	C6
3431	C8
3435	D8
3436	D8
3437	D11
3440	F2
3441	E2
3442	F2
3443	E3
3444	E11
3445	E11
3446	E12
3447	D12
3448	F10
3450	A10
3451	A10
3452	F10
3453	F11
3454	D11
3460	C11
3461	C11
3462	G10
3463	G10
3464	H10
3465	H10
3469	D12
3498	H12
3499	H12
3689	C10
5400	G2
5401	A8
5402	A6
5410	B3
5411	B4
5421	C7
5422	F6
5423	B6
5424	E6
5425	C5
5426	A5
5430	A9
5461	C11
5463	G10
5465	H10
5466	C10
5469	B10
6400	B11
6401	F12
6406	C2
6407	A2
6408	A2
6409	D10
6410	D11
6411	E10
6412	E10
6413	E10
6414	E10
6415	F10
6421	A6
6422	C6
6423	B6
6434	E8
6435	D8
6460	C12
6462	G11
6463	H11
6464	H11
6465	H11
7407	F11
7408	D3
7409	C3
7421	B4
7445	F2
9401	A8
9410	C10
9417	C4
9423	B6
9425	C5
9426	A5
9484	A12
9623	B4


A3
LINE DEFLECTION
1 2 3 4 5 6 7 8 9 10 11 12 13 14
A B C D E F G H
COLD
HOT
+11D
11V2
6408
10V4
BYD33D
+5.2V
6407
MCL4148
5V2
3415 15R
3416 100R
3411 39R
2413 10u
47n 2412
2414 47n
5410
CE165T
A8-3
LINEDRIVE1
100u
2492
3406 100R
3414 330R
0V4
A22
7409 BC847B
6V6
2409 47p
A24
6406 MCL4148
0V
2415 220p
3407 10K
A23
7408 BC368
3404 470R
A8-4
GND-LINEDRIVE
A3-48
+11D
POR-CIRCUIT
POR
A6-A8-45
3440 1K
3441 22K
7445
BC847B
0V6
3442 470K
3443 680K
2440 1u
GND-SUP
3409 1K
9623
5411 560n
0V1
A25
7421 BU2520DX
9426
5426 90R
A26
2418
RES 470p
2417 220n 9417
3417 10R
1n2 2420
3410 47R
2494 220n
5402 150u
2495 220n
SUP-ENABLE
A1-A4-23
LINE DEFLECTION
2425 11n
2435 9n1
2488 430n
2428 27n
6421 BY359X-1500
5423 RES 560n
9423
RES 3423
6R8 6423
BY228/20
5425 83R
9425
RES 3425 10R
3426 10R
RES 6422
BY229X-600
2419 470p
2423 470n
2422 1u2
2421 680n
5424 CU15
5422 CU20
3u6 5421
2430 3n3
3431 150R
2431 3n3
2424 2u2 RES
2432 680n
2433 680n
2434 470n
RES 3435 33K
RES 3436 33K
6435 BYD33J
6434 BYD33J
RES
1417
LINE DEFLECTION COIL
RES 9401
+141V
5401 18u
2401 6n8
3401 27R
3402 120R
5430 OV2076
EHT
TO FOCUS
G2
F
CRT PANEL
1493
SIN
TO RES 1430
GND-SUP
2405 1n5
3450 10K
3451 10K
2450 100n
EHT-INFO
RES
5469
9410
3689 1K
2469 3n3
5466 22u
3400 1R
BYV95C 6400
2468 470p
2402 33u
A28
1424
TO 0224
C
CRT PANEL
FILAMENT
9484
-1V4
5V8
233V
A3-48+11D
A8-20
EHT-INFO
HFB_X-RAY-PROT
A8-41
1491
TO 1491
VDAF
+11D
1498 1499
3460 1R
3461 1R
5461
2461 470p
A29
6460 BYV95C
A30
3469 1K
2460 1m
NC
+11D
1492
TO 1492
FILAMENT PULSES
6409 RES
6410 RES
3454 1R
2442 6n8
3437 10R
3444 1R
3445 RES
3446 RES
3447 100R
6412 BAS316
6411 RES
6413 BAS316
6414 PDZ-8.2B
6415 PDZ-15B
2441 22n
2445 22n
2443 560p
3453 100R
6401 BAS316
3448 2K7
7407 BC817-25
2444 1u
3452 470R
x = AC FILAMENT
# = USA XRAY PROT
xx = DC FILAMENT
3462 1R
3463 1R
5463
2463 470p
A31
6462 BYW76
6463 BYV29X-500
+13V-LOT
2462 1m
13V7
1495
N.C
3498 5R6
3499 5R6
-12V8
-15V-LOT
3464 1R
3465 1R
5465
2465 470p
A32
6464 BYW76
6465 BYV29X-500
0V4
-15V2
2464 1m
VBATT
5400 33u
+141V
2400 47u
0040
HEATSINK
A22 PM3394B 1V / div DC 10us / div
A23 PM3394B 200mV / div DC 10us / div
A24 PM3394B 5V / div DC 10us / div
A25 200 V / div DC 10µs / div
A30 50 V / div DC 10µs / div
EW A4-46
3139 123 5523.1
CL 36532058_052.eps 030903

Item	Remarks	28WSRF EU LGPD MK2	32RF 4X3 NA TOS	29RF 4X3 AP SAM	32WSRF EU LGPD MK2	28SF 4X3 EU LGPD	32WSRF LA LGPD	36WSRF LA MEC	34WSRF NA MEC	34RF 4X3 AP LGPD	32RF 4X3 NA LGPD	27RF 4X3 NA SAM	30WSRF NA LGPD MK2	29RF 4X3 EU LGPD	36WSRF LGPD	DESCRIPTION
2405		V	—	—	V	—	V	—	—	—	—	—	—	V	—	CERSAF NSA 250V S 1N PM20 B
2405		—	—	—	—	—	—	—	—	—	—	—	—	—	V	CERSAF KX 250V S 470P PM10 B
2420		V	—	V	V	—	V	—	—	—	—	V	—	—	—	CAP PP-MPP 2KV S 1N PM5 B
2420		—	—	—	—	V	—	—	—	—	—	—	—	—	—	CAP PP-MPP 2KV S 1N2 PM5 B
2420		—	—	—	—	—	—	—	—	V	V	—	V	—	—	CAP PP-MPP 2KV S 680P PM5 B
2420		—	V	—	—	—	—	—	—	—	—	—	—	—	—	CAP PP-MPP 2KV S 1N8 PM5 B
2420		—	—	—	—	—	—	—	—	—	—	—	—	V	—	CAP PP-MPP 2KV S 1N5 PM5 B
2420		—	—	—	—	—	—	V	V	—	—	—	—	—	V	CAP PP-MPP 2KV S 820P PM5 B
2421		—	V	V	—	—	—	—	—	—	—	—	—	V	—	CAP MPP 250V S 560N PM5 B
2421		V	—	—	V	V	V	V	V	—	—	V	V	—	V	CAP MPP 250V S 1U2 PM5 B
2421		—	—	—	—	—	—	—	—	V	V	—	—	—	—	CAP MPP 479 250V S 430N PM5 B
2425		—	V	—	—	—	—	—	—	V	V	—	—	—	—	CAP PP-MPP 2KV S 8N2 PM5 B
2425		—	—	V	—	V	—	V	V	—	—	V	—	V	V	CAP PP-MPP 2KV S 9N1 PM5 B
2425		V	—	—	V	—	V	—	—	—	—	—	V	—	—	CAP PP-MPP 2KV S 10N PM5 B
2426		—	—	—	—	—	—	—	—	—	—	V	—	—	—	CAP PP-MPP 630V S 18N PM5 B
2426		V	—	V	V	—	V	V	V	—	—	—	V	V	V	CAP PP-MPP 630V S 22N PM5 B
2426		—	—	—	—	V	—	—	—	—	—	—	—	—	—	CAP PP-MPP 630V S 24N PM5 B
2426		—	V	—	—	—	—	—	—	V	V	—	—	—	—	CAP PP-MPP 630V S 20N PM5 B
2433		—	—	V	—	—	—	—	—	—	—	V	—	V	—	CAP MPP 250V S 510N PM5 B
2433		—	V	—	—	—	—	—	—	—	—	—	—	—	—	CAP MPP 250V S 820N PM5 B
2433		V	—	—	V	V	V	V	V	—	—	—	V	—	V	CAP MPP 250V S 360N PM5 B
2433		—	—	—	—	—	—	—	—	V	V	—	—	—	—	CAP MPP 479 250V S 560N PM5 B
2441		—	—	—	—	—	—	—	—	—	—	—	—	—	V	CER2 0805 X7R 50V 22N COL R
2441		—	—	—	—	—	—	—	—	—	V	V	—	—	—	CER2 0603 X7R 25V 22N COL
2442		—	—	—	—	—	—	—	—	—	V	V	—	—	V	CER2 0805 X7R 50V 6N8 COL R
2443		—	—	—	—	—	—	—	—	—	V	V	—	—	—	CER1 0805 NP0 50V 560P COL R
2443		V	V	V	V	V	V	V	V	V	—	—	V	V	V	CER2 0805 X7R 50V 470P COL R
2444		—	V	—	—	—	—	V	V	—	V	V	V	—	V	CER2 0805 X7R 16V 1U PM10 R
2445		—	—	—	—	—	—	—	—	—	—	—	—	—	V	CER2 0805 X7R 50V 22N COL R
2445		—	—	—	—	—	—	—	—	—	V	V	—	—	—	CER2 0603 X7R 25V 22N COL
2450		—	—	—	—	—	—	V	V	V	V	—	V	—	V	CAP MPOL 63V S 220N PM10 A
2450		—	—	—	—	—	—	—	—	—	—	V	—	—	—	CAP MPOL 63V S 330N PM10 A
2450		V	V	V	V	V	V	—	—	—	—	—	—	V	—	CAP MPOL 100V S 100N PM10 A
2483	in A8	—	—	—	—	—	—	—	—	—	—	—	V	—	—	CER2 0603 X7R 16V 100N COL
2483	in A8	V	—	—	V	—	V	V	V	V	V	—	—	V	V	CER2 0603 X7R 50V 15N COL
2496	in A8	V	—	—	V	—	V	V	V	V	V	—	V	V	V	CER2 0603 X7R 16V 100N COL
2496	in A8	—	—	—	—	—	—	—	—	—	—	V	—	—	—	CER2 0603 X7R 50V 6N8 COL
3427	in A8	—	—	—	—	—	—	—	—	—	—	—	—	V	—	RST SM 0603 100K PM5 COL
3427	in A8	—	—	—	—	—	—	V	V	—	—	V	V	—	V	RST SM 0603 56K PM5 COL
3427	in A8	V	—	—	V	—	V	—	—	V	V	—	—	—	—	RST SM 0603 68K PM5 COL
3428	in A8	—	—	—	—	—	—	—	—	V	V	—	—	—	—	RST SM 0603 RC21 560K PM5 R
3428	in A8	—	—	—	—	—	—	—	—	—	—	—	—	—	V	RST SM 0603 RC21 820K PM5 R
3428	in A8	—	—	—	—	—	—	—	—	—	—	—	V	—	—	RST SM 0603 330K PM5 COL
3428	in A8	V	—	—	V	—	V	V	V	—	—	V	—	V	—	RST SM 0603 680K PM5 COL
3429	in A8	V	—	—	V	—	V	—	—	—	—	—	—	—	V	RST SM 0603 10K PM5 COL
3429	in A8	—	—	—	—	—	—	—	—	—	—	—	V	—	—	RST SM 0603 100K PM5 COL
3429	in A8	—	—	—	—	—	—	—	—	V	V	—	—	V	—	RST SM 0603 22K PM5 COL
3429	in A8	—	—	—	—	—	—	V	V	—	—	—	—	—	—	RST SM 0603 33K PM5 COL
3430	in A8	—	—	—	—	—	—	—	—	—	—	—	V	—	—	RST SM 0603 100K PM5 COL
3430	in A8	V	—	—	V	—	V	—	—	—	—	—	—	—	—	RST SM 0603 12K PM5 COL
3430	in A8	—	—	—	—	—	—	V	V	V	V	—	—	V	V	RST SM 0603 22K PM5 COL
3431		—	—	—	—	—	—	—	—	V	V	—	—	—	—	RST FUSE NFR25 S 220R PM5 A
3431		V	V	V	V	V	V	V	V	—	—	V	V	V	V	RST FUSE NFR25H S 150R PM5 A
3432	in A8	—	—	—	—	—	—	—	—	V	V	—	—	—	—	RST SM 0603 RC21 390K PM5 R
3432	in A8	—	—	—	—	—	—	—	—	—	—	V	—	—	—	RST SM 0603 RC21 470K PM5 R

Large Signal Panel: Frame Deflection & E/W Drive

1625 D12
1627 D12
1693 G4
2403 E3
2404 E2
2448 C11
2451 H2
2454 G2
2457 F3
2458 F1
2466 E12
2480 G9
2481 G8
2482 H9
2487 B12
2490 F7
2491 G12
2493 H3
2497 F11
2498 G13
2499 F12
2603 D6
2604 D9
2605 D5
2620 D9
2621 E9
2622 B10
2623 D3
2624 D10
2625 D10
2627 D11
2628 B7
2629 D12
2630 D8
2631 C8
2633 E6
2635 B8
2642 C11
2653 E10
2656 C2
2657 C3
2659 D1
2660 G11
2661 D7
2662 D2
3403 B13
3412 F5
3418 G9
3419 E2
3420 E3
3421 E1
3422 E3
3449 G2
3455 E1
3456 E1
3457 E3
3458 F3
3459 F2
3466 F12
3467 B12
3472 F11
3474 F12
3475 G11
3476 F11
3478 G10
3479 G10
3480 G10
3481 G9
3482 G9
3483 G8
3484 G8
3485 G7
3486 G3
3487 G3
3488 F9
3489 G9
3490 F5
3491 G11
3492 F7
3493 F8
3495 G12
3496 H8
3497 E13
3610 C4
3611 D3
3620 E10
3621 E10
3622 E10
3623 E9
3624 D10
3625 D11
3626 D11
3627 D11
3628 B6
3629 D12
3630 C8
3631 C7
3632 D6
3633 C6
3634 D8
3635 B8
3636 B9
3637 B9
3638 C8
3639 D5
3640 B7
3641 D5
3642 C7
3643 C8
3644 C11
3645 B11
3646 D11
3647 D11
3648 E11
3652 C12
3653 D11
3654 G3
3655 C2
3656 C2
3657 D3
3658 D2
3659 D1
3660 C6
3661 D12
3662 C6
3663 D12
3664 D2
3665 C11
3688 H9
3690 D7
5467 G10
5620 C11
5621 C5
6405 B11
6442 C11
6455 F2
6456 G3
6457 H2
6458 H2
6480 F10
6481 G9
6482 G8
6483 G9
6491 F13
6493 G11
6494 G11
6499 G13
6614 D5
6615 F5
6616 D5
6617 C6
6618 C6
6619 D11
6620 B9
6621 B10
6622 C10
6623 C11
6624 D12
6625 A7
6626 A6
6627 A6
6628 D12
7440-A C3
7440-B E2
7441 E3
7442 E12
7443 B12
7450-A C4
7450-B G4
7455 F3
7480 G10
7482 G5
7483 F5
7486 G8
7487 G7
7611 C7
7612 E6
7613 B8
7614 D5
7620 C9
7641 B11
7652 C12
7653 G12
7654 F12
9405 G3
9481 G4
9482 G7
9483 F7
9499 G12
9620 C10
9622 C10



NOTE BRIDGECOIL PROTECTION (5422) IS TRIGGERED VIA EW (SEE DIAGRAM A3 ALSO)

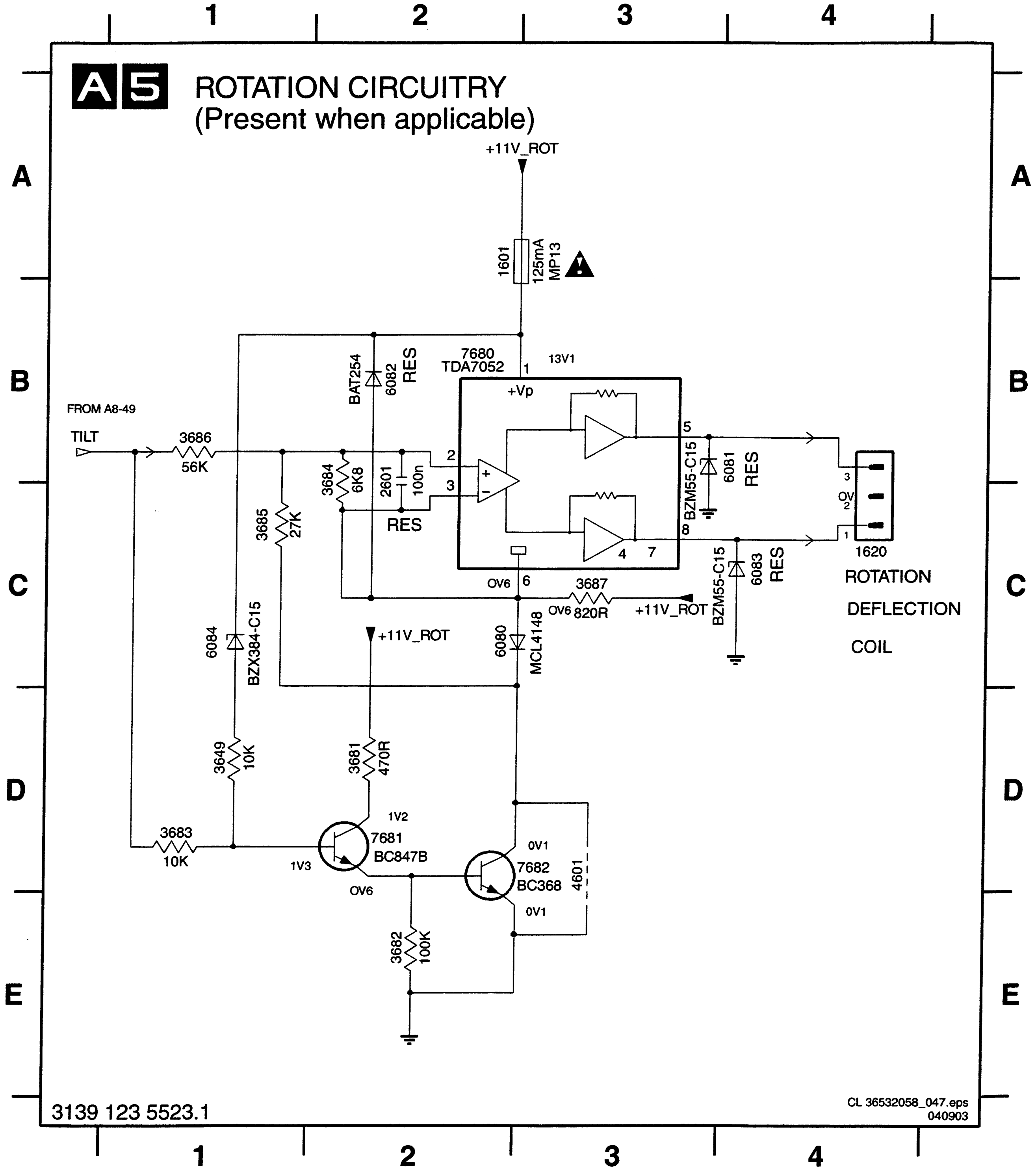
3139 123 5523.1

CL 36532058_046.eps
040903

Item	28/32" WSRF LGPD	34/36" 4:3 RF TOSJ	29" 4:3 RF SMGK	28" 4:3 SF PHCO	36" WSRF MEC	32RF 4X3 NA LGPD	27RF 4X3 NA SAM	30WSRF NA LGPD	34 4:3RF AP LGPD	32WSRF LGPD MKII	29RF EU LGPD	36WSRF_LGPD	DESCRIPTION
1625	V	V	V	V	---	V	V	V	V	V	V	---	CON V 3P M 2.50 BK EH-A B
1627	---	---	---	---	V	---	---	---	---	---	---	V	CON V 3P M 2.50 BK EH-A B
2490	V	V	V	V	---	---	---	---	---	V	V	---	ELCAP 10V S 100U PM20 COL A
2490	---	---	---	---	V	V	V	V	V	---	---	V	ELCAP 50V S 100U PM20 COL A
2498	V	V	V	V	---	---	---	---	---	V	V	---	CER2 0805 X7R 16V 1U PM10 R
2633	V	V	V	V	---	V	V	V	V	V	V	---	CER2 0603 X7R 50V 3N3 COL
2633	---	---	---	---	V	---	---	---	---	---	---	V	CER2 0603 X7R 50V 6N8 COL
2653	---	---	V	---	---	---	---	---	---	---	V	---	CER2 0603 X7R 50V 2N7 PM10 R
2653	---	---	---	---	V	V	V	V	V	---	---	V	CER2 0603 X7R 50V 2N2 COL
2653	V	V	---	V	---	---	---	---	---	V	---	---	CER2 0603 X7R 50V 3N3 COL
2661	---	---	---	---	V	---	---	---	---	---	---	V	CER2 0603 X7R 50V 6N8 COL
2662	---	---	---	---	V	V	V	V	V	---	---	V	CER2 0603 X7R 50V 3N3 COL
3403	V	V	V	V	V	V	V	V	V	V	V	V	RST CRB 1/6W A 100R PM5 COL A
3412	V	V	V	V	V	V	V	V	V	V	V	V	RST SM 0603 1K2 PM5 COL
3418	---	---	---	---	V	---	---	---	---	---	---	V	RST MFLM MBB0207 A 47K PM1 A
3418	V	V	V	V	---	V	V	V	V	V	V	---	RST MFLM MBB0207 A 56K PM1 A
3480	V	---	---	V	V	---	---	V	---	V	---	V	RST FUSE NFR25 S 4R7 PM5 A
3480	---	V	V	---	---	V	V	---	V	---	V	---	RST FUSE NFR25 S 6R8 PM5 A
3483	V	---	V	V	V	---	V	V	---	V	V	V	RST SM 0603 1K8 PM5 COL
3483	---	V	---	---	---	V	---	---	V	---	---	---	RST SM 0603 2K2 PM5 COL
3484	---	---	---	---	V	V	V	V	V	---	---	V	RST SM 0603 4K7 PM5 COL
3488	V	---	V	V	V	---	V	V	---	V	V	V	RST MFLM MBB0207 A 1M PM1 A
3491	---	---	---	---	---	V	V	V	V	---	---	---	RST SM 0603 27K PM5 COL
3491	---	---	---	---	V	---	---	---	---	---	---	V	RST SM 0603 39K PM5 COL
3491	V	V	V	V	---	---	---	---	---	V	V	---	RST SM 0603 47K PM5 COL
3493	V	V	V	V	---	---	---	---	---	V	V	---	RST MFLM MBB0207 A 150K PM1 A
3495	V	V	V	V	---	---	---	---	---	V	V	---	RST MFLM MBB0207 A 15K PM1 A
3620	V	---	---	---	---	---	---	---	---	V	---	---	RST CRB CFR25S A 1R8 PM5 A
3620	---	---	---	V	V	---	---	---	---	---	---	V	RST CRB CFR25S A 1R5 PM5 A
3620	---	V	---	---	---	---	---	V	---	---	---	---	RST CRB CFR25S A 1R2 PM5 A
3620	---	---	V	---	---	V	V	---	V	---	V	---	RST CRB 1/6W A 1R PM5 COL A
3621	---	---	---	---	V	---	---	V	---	---	---	V	RST CRB CFR25S A 1R5 PM5 A
3621	---	V	---	---	---	---	---	---	V	---	---	---	RST CRB CFR25S A 1R2 PM5 A
3621	V	---	V	V	---	V	V	---	---	V	V	---	RST CRB 1/6W A 1R PM5 COL A
3622	V	---	---	---	---	---	---	---	---	---	---	---	RST CRB ERDS2T A 3R3 PM5 A
3622	---	---	---	V	V	---	---	V	---	---	---	V	RST CRB CFR25S A 1R5 PM5 A
3622	---	V	V	---	---	---	---	---	---	---	---	---	RST CRB CFR25S A 1R2 PM5 A
3622	---	---	---	---	---	---	V	---	---	---	---	---	RST CRB 1/6W A 1R PM5 COL A
3622	---	---	---	---	---	V	---	---	V	V	---	---	RST CRB 1/6W A 2R2 PM5 COL A
3623	V	V	V	V	V	V	---	V	V	V	V	V	RST CRB 1/6W A 18K PM5 COL A
3623	---	---	---	---	---	---	V	---	---	---	---	---	RST CRB 1/6W A 22K PM5 COL A
3625	---	---	V	---	---	V	V	---	V	---	V	---	RST CRB 1/6W A 120R PM5 COL A
3625	---	---	---	---	V	---	---	V	---	---	---	V	RST CRB 1/6W A 220R PM5 COL A
3625	V	V	---	V	---	---	---	---	---	V	---	---	RST CRB 1/6W A 330R PM5 COL A
3626	---	---	V	---	---	V	V	---	V	---	V	---	RST CRB 1/6W A 100R PM5 COL A
3626	---	---	---	---	V	---	---	V	---	---	---	V	RST CRB 1/6W A 220R PM5 COL A
3626	V	V	---	V	---	---	---	---	---	V	---	---	RST CRB 1/6W A 330R PM5 COL A
3627	---	---	---	---	V	V	V	V	V	---	---	V	RST SM 0805 10K PM5 COL R
3627	V	V	V	V	---	---	---	---	---	V	V	---	RST SM 0805 22K PM5 COL R
3630	---	---	---	---	---	V	---	---	V	---	---	---	RST SM 0603 27K PM5 COL
3630	V	V	V	V	V	---	V	V	---	V	V	V	RST SM 0603 33K PM5 COL
3632	---	---	---	---	V	---	---	---	---	---	---	V	RST SM 0603 18K PM5 COL
3632	---	---	---	---	---	V	---	---	V	---	---	---	RST SM 0603 33K PM5 COL
3632	V	V	V	V	---	---	V	V	---	V	V	---	RST SM 0603 39K PM5 COL

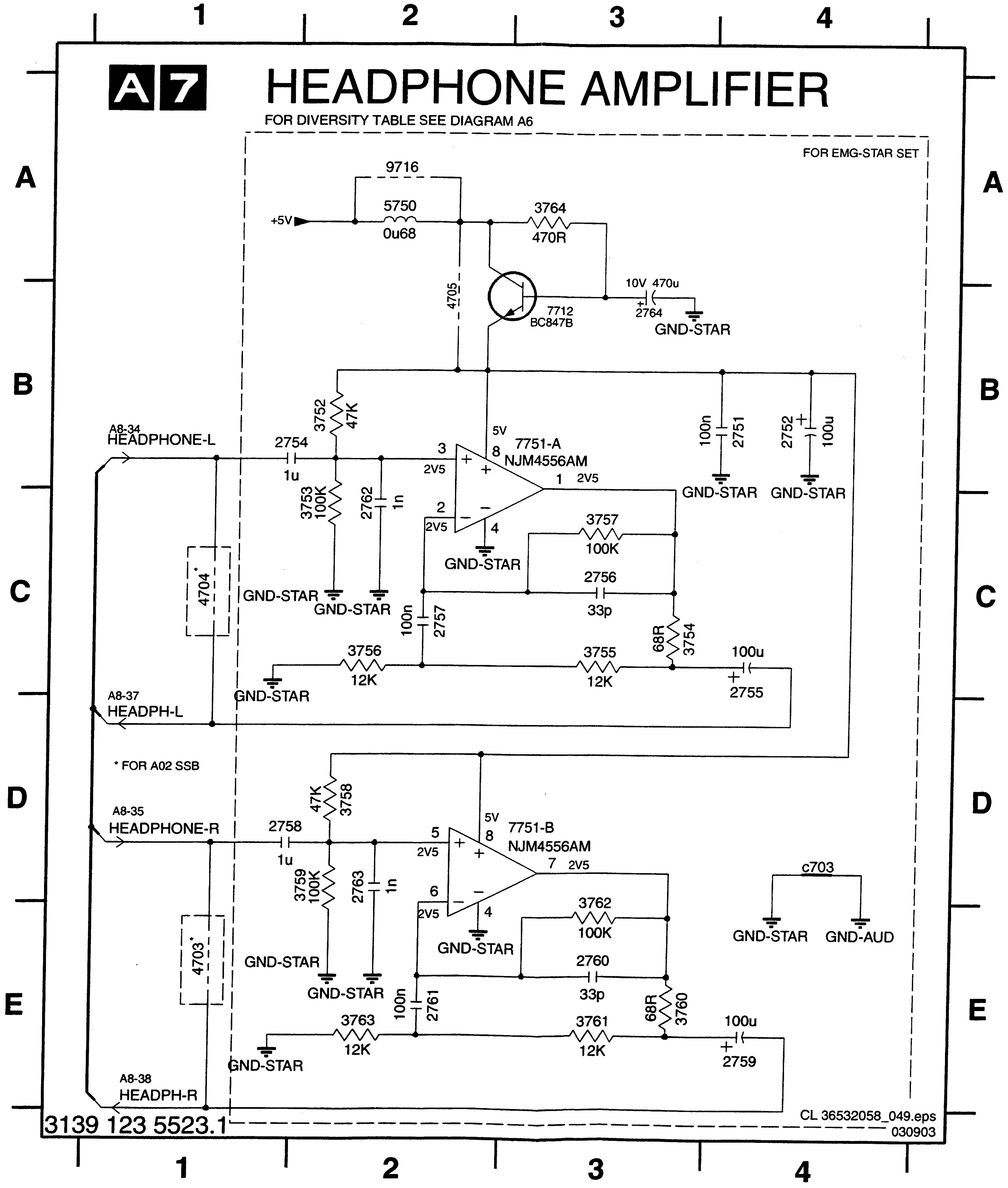
Large Signal Panel: Rotation Circuitry

1601 A2
1620 C4
2601 B2
3649 D1
3681 D2
3682 E2
3683 D1
3684 B2
3685 C1
3686 B1
3687 C3
4601 D3
6080 C2
6081 B3
6082 B2
6083 C4
6084 C1
7680 B2
7681 D2
7682 D3

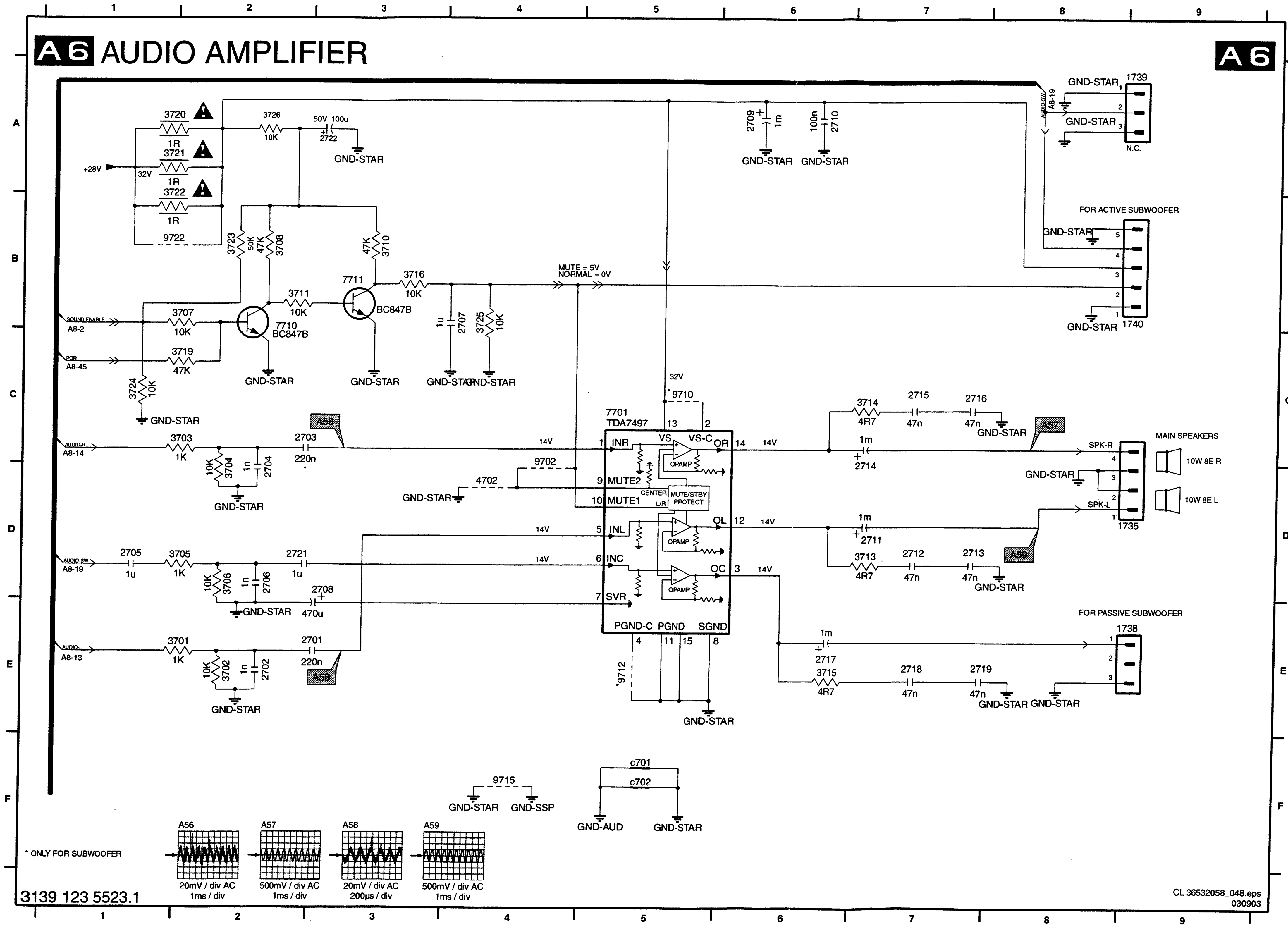

A5 ROTATION CIRCUITRY
(Present when applicable)
+11V_ROT
1601 125mA MP13
7680 TDA7052
13V1
+Vp
BAT254
6082 RES
FROM A8-49
TILT
3686 56K
3684 6K8
2601 100n
RES
3685 27K
BZM55-C15 6081 RES
1620
ROTATION
DEFLECTION
COIL
0V
OV6
3687 820R
+11V_ROT
6080 MCL4148
BZM55-C15 6083 RES
6084 BZX384-C15
3649 10K
3681 470R
3683 10K
7681 BC847B
1V2
1V3
7682 BC368
0V1
4601
3682 100K
3139 123 5523.1
CL 36532058_047.eps 040903
A B C D E
1 2 3 4

Large Signal Panel: Headphone Amplifier

2751 B4
2752 B4
2754 B1
2755 C4
2756 C3
2757 C2
2758 D1
2759 E4
2760 E3
2761 E2
2762 C2
2763 D2
2764 B3
3752 B2
3753 C2
3754 C3
3755 C3
3756 C2
3757 C3
3758 D2
3759 D2
3760 E3
3761 E3
3762 E3
3763 E2
3764 A3
4703 E1
4704 C1
4705 B2
5750 A2
7712 B3
7751-A B3
7751-B D3
9716 A2
c703 D4


A7 HEADPHONE AMPLIFIER
FOR DIVERSITY TABLE SEE DIAGRAM A6
FOR EMG-STAR SET
9716
5750 0u68
+5V
3764 470R
4705
7712 BC847B
10V 470u 2764
GND-STAR
A8-34 HEADPHONE-L
2754 1u
3752 47K
3753 100K
2762 1n
7751-A NJM4556AM
5V
2V5
3757 100K
2756 33p
2751 100n
2752 100u
4704*
2757 100n
3756 12K
3755 12K
3754 68R
2755 100u
A8-37 HEADPH-L
* FOR A02 SSB
A8-35 HEADPHONE-R
2758 1u
3758 47K
3759 100K
2763 1n
7751-B NJM4556AM
3762 100K
2760 33p
4703*
2761 100n
3763 12K
3761 12K
3760 68R
2759 100u
c703
GND-AUD
A8-38 HEADPH-R
3139 123 5523.1
CL 36532058_049.eps 030903
A B C D E
1 2 3 4

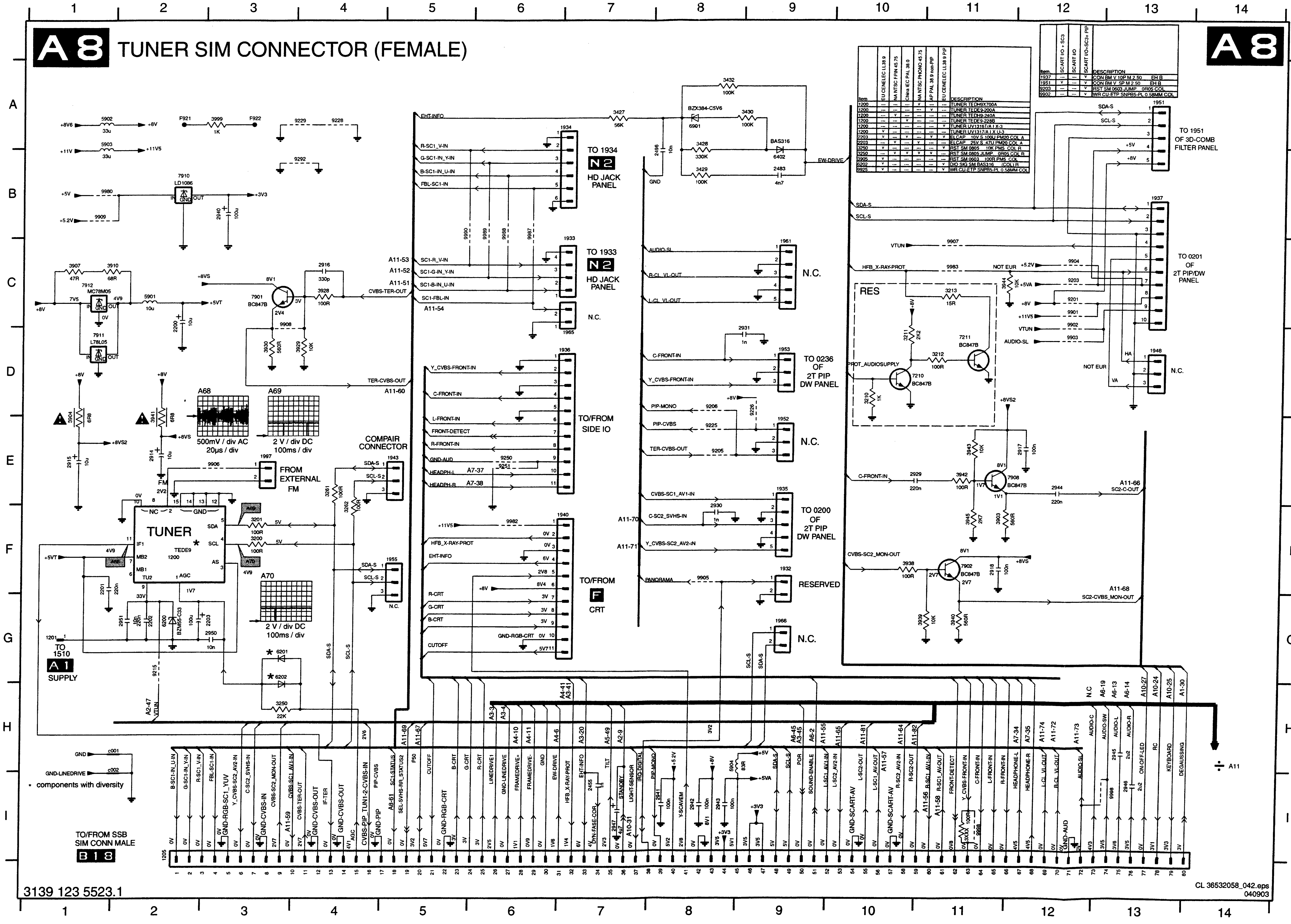
Large Signal Panel: Audio Amplifier


A6 AUDIO AMPLIFIER
A6
1 2 3 4 5 6 7 8 9
A B C D E F
3720 1R
3721 1R
3722 1R
9722
+28V
32V
3726 10K
50V 100u 2722
GND-STAR
2709 1m
100n 2710
A8-19 AUDIO-SW
GND-STAR 1739
GND-STAR
N.C.
FOR ACTIVE SUBWOOFER
GND-STAR 1740
3723 50K
47K 3708
47K 3710
7711 BC847B
3716 10K
MUTE = 5V NORMAL = 0V
SOUND-ENABLE A8-2
POR A8-45
3707 10K
3711 10K
7710 BC847B
3719 47K
3724 10K
1u 2707
3725 10K
32V
* 9710
7701 TDA7497
AUDIO-R A8-14
3703 1K
10K 3704
1n 2704
2703 220n
A56
14V
INR VS VS-C OR
9702
4702
MUTE2
MUTE1
CENTER L/R
MUTE/STBY PROTECT
OPAMP
INL
INC
SVR
OL
OC
PGND-C PGND SGND
3714 4R7
2715 47n
2716 47n
A57
1m 2714
SPK-R
SPK-L
MAIN SPEAKERS
10W 8E R
10W 8E L
1735
1m 2711
3713 4R7
2712 47n
2713 47n
A59
AUDIO-SW A8-19
2705 1u
3705 1K
10K 3706
1n 2706
2721 1u
2708 470u
AUDIO-L A8-13
3701 1K
10K 3702
1n 2702
2701 220n
A58
*9712
FOR PASSIVE SUBWOOFER
1738
1m 2717
3715 4R7
2718 47n
2719 47n
GND-STAR GND-STAR
9715
GND-STAR GND-SSP
c701
c702
GND-AUD GND-STAR
* ONLY FOR SUBWOOFER
A56 A57 A58 A59
20mV / div AC 1ms / div
500mV / div AC 1ms / div
20mV / div AC 200µs / div
500mV / div AC 1ms / div
3139 123 5523.1
CL 36532058_048.eps 030903

1735	D8
1738	E8
1739	A8
1740	B8
2701	E3
2702	E2
2703	C2
2704	D2
2705	D1
2706	D2
2707	B4
2708	D3
2709	A6
2710	A6
2711	D7
2712	D7
2713	D7
2714	C7
2715	C7
2716	C7
2717	E6
2718	E7
2719	E7
2721	D2
2722	A3
3701	E2
3702	E2
3703	C2
3704	D2
3705	D2
3706	D2
3707	B2
3708	B2
3710	B3
3711	B2
3713	D7
3714	C7
3715	E6
3716	B3
3719	C2
3720	A1
3721	A1
3722	B1
3723	B2
3724	C1
3725	B4
3726	A2
4702	D4
7701	C5
7710	C2
7711	B3
9702	D4
9710	C5
9712	E5
9715	F4
9722	B1
c701	F5
c702	F5

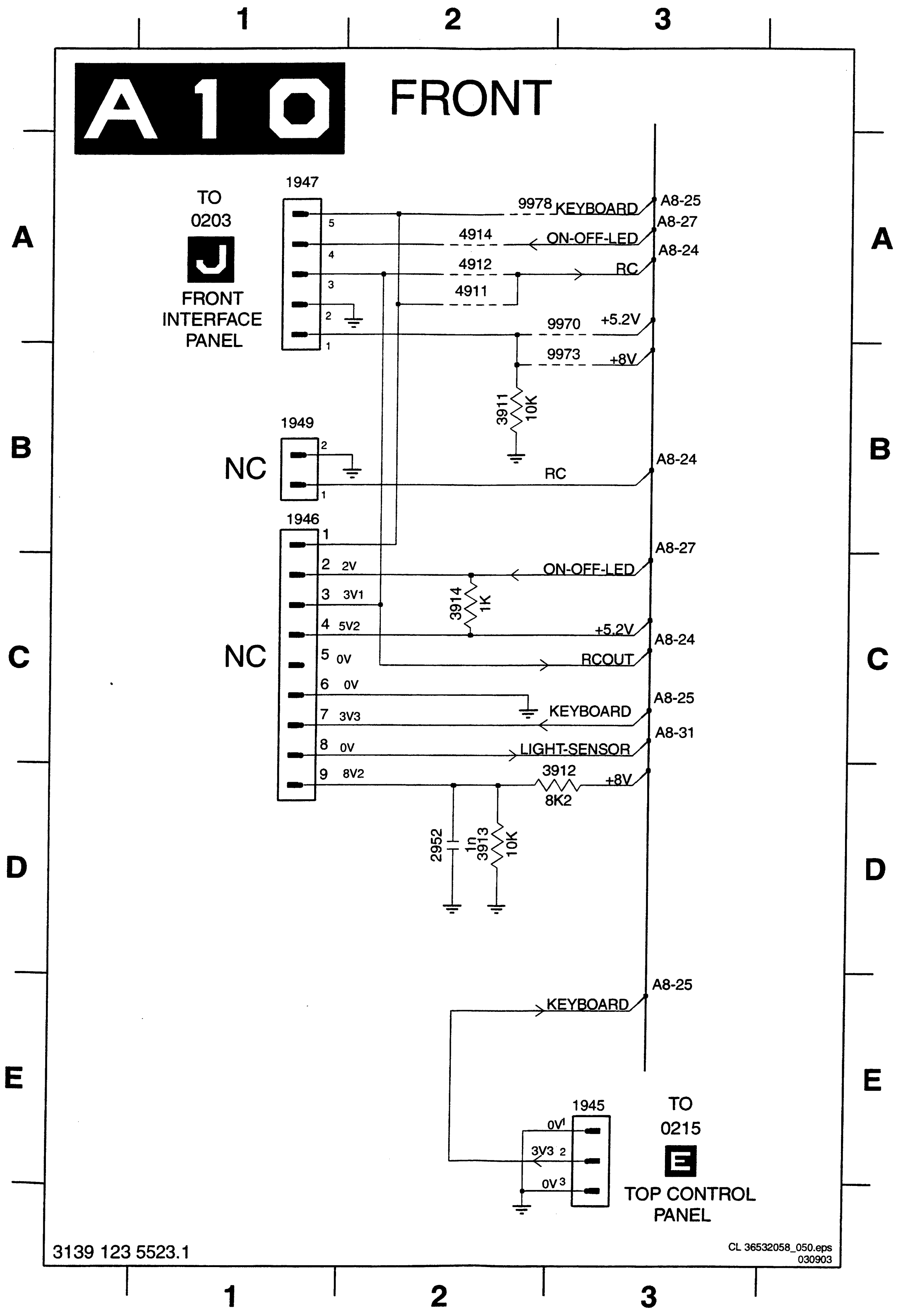
Item	2x10W w/o HP Amp	3x10W w/o HP Amp + Subwoofer	2x10W with EXT Subwoofer	3x10W with HP amp + Subwoofer	2x10W with HP Amp	DESCRIPTION
1738	---	V	---	V	---	CON BM V 3P M 2.50 EH B
1739	---	---	V	---	---	CON BM V 3P M 2.50 EH B
2701	V	---	V	---	V	CER2 0805 Y5V 16V 1U COL R
2701	---	V	---	V	---	CER2 0603 X7R 16V 100N COL
2702	V	V	V	V	V	CER1 0603 NP0 25V 1N COL
2703	V	---	V	---	V	CER2 0805 Y5V 16V 1U COL R
2703	---	V	---	V	---	CER2 0603 X7R 16V 100N COL
2704	V	V	V	V	V	CER1 0603 NP0 25V 1N COL
2705	---	V	---	V	---	CER2 0805 Y5V 16V 1U COL R
2706	---	V	---	V	---	CER2 0603 X7R 50V 3N3 COL
2711	V	---	V	---	V	ELCAP 25V S 1000U PM20 COL B
2711	---	V	---	V	---	ELCAP 25V S 470U PM20 COL B
2714	V	---	V	---	V	ELCAP 25V S 1000U PM20 COL B
2714	---	V	---	---	---	ELCAP 25V S 470U PM20 COL B
2715	V	V	V	V	V	CER2 0603 X7R 16V 47N COL
2716	V	V	V	V	V	CER2 0603 X7R 16V 47N COL
2717	---	V	---	V	---	ELCAP 25V S 1000U PM20 COL B
2718	---	V	---	V	---	CER2 0603 X7R 16V 47N COL
2719	---	V	---	V	---	CER2 0603 X7R 16V 47N COL
2721	---	---	---	V	---	CER2 0603 X7R 10V 220N COL
2721	---	V	---	---	---	CER2 0603 Y5V 10V 470N COL
2751	---	---	---	V	V	CER2 0805 Y5V 50V 100N P8020 R
2752	---	---	---	V	V	ELCAP 25V S 100U PM20 COL A
2753	---	---	---	V	V	CER2 0805 Y5V 50V 100N P8020 R
2754	---	---	---	V	V	CER2 0805 Y5V 16V 1U COL R
2755	---	---	---	V	V	ELCAP 25V S 100U PM20 COL A
2756	---	---	---	V	V	CER1 0603 NP0 50V 33P COL
2757	---	---	---	V	V	CER2 0603 X7R 16V 100N COL
2758	---	---	---	V	V	CER2 0805 Y5V 16V 1U COL R
2759	---	---	---	V	V	ELCAP 25V S 100U PM20 COL A
2760	---	---	---	V	V	CER1 0603 NP0 50V 33P COL
2761	---	---	---	V	V	CER2 0603 X7R 16V 100N COL
2762	---	---	---	V	V	CER1 0603 NP0 25V 1N COL
2763	---	---	---	V	V	CER1 0603 NP0 25V 1N COL
2764	---	---	---	V	V	ELCAP 10V S 470U PM20 COL A
3703	V	V	V	V	---	RST SM 0603 10K PM5 COL
3703	---	---	---	---	V	RST SM 0603 18K PM5 COL
3704	V	V	V	V	---	RST SM 0603 22K PM5 COL
3704	---	---	---	---	V	RST SM 0805 10K PM5 COL R
3705	---	V	---	V	---	RST SM 0603 10K PM5 COL
3706	---	V	---	---	---	RST SM 0603 22K PM5 COL
3706	---	---	---	---	V	RST SM 0805 10K PM5 COL R
3706	---	---	---	V	---	RST SM 0805 22K PM5 COL R
3715	---	V	---	V	---	RST SM 0603 RC21 8R2 PM5 R
3722	---	V	---	V	---	RST FUSE NFR25 S 1R PM5 A
3751	---	---	---	V	V	RST SM 0603 22K PM5 COL
3752	---	---	---	V	V	RST SM 0603 47K PM5 COL
3753	---	---	---	V	V	RST SM 0603 47K PM5 COL
3754	---	---	---	V	V	RST CRB CFR25S A 3R9 PM5 A
3755	---	---	---	V	V	RST SM 0603 12K PM5 COL
3756	---	---	---	V	V	RST SM 0603 12K PM5 COL
3757	---	---	---	V	V	RST SM 0603 100K PM5 COL

Large Signal Panel: Tuner SIMM Connector (Female)


A8
TUNER SIM CONNECTOR (FEMALE)
TUNER
TEDE9
1200
TO 1934
N2
HD JACK PANEL
TO 1933
N2
HD JACK PANEL
N.C.
TO/FROM SIDE IO
COMPAIR CONNECTOR
FROM EXTERNAL FM
TO/FROM
F
CRT
TO 1951 OF 3D-COMB FILTER PANEL
TO 0201 OF 2T PIP/DW PANEL
TO 0236 OF 2T PIP DW PANEL
TO 0200 OF 2T PIP DW PANEL
RESERVED
RES
TO 1510
A1
SUPPLY
TO/FROM SSB SIM CONN MALE
B18
* components with diversity
A68
A69
A70
500mV / div AC 20µs / div
2 V / div DC 100ms / div
2 V / div DC 100ms / div
3139 123 5523.1
CL 36532058_042.eps 040903

1200	F2
1201	G1
1205	I2
1932	F9
1933	B6
1934	A6
1935	E9
1936	D6
1937	B13
1940	F6
1943	E5
1948	D13
1951	A13
1952	E9
1953	D9
1955	F5
1961	C9
1965	D6
1966	G9
1997	E3
2200	D2
2201	F1
2202	G2
2203	G3
2455	I7
2483	B9
2496	B8
2914	E2
2915	E1
2916	C4
2917	E12
2918	F11
2929	E10
2930	F8
2931	D9
2940	B3
2941	I8
2942	I8
2943	I8
2944	E12
2945	H13
2946	I13
2947	I7
2950	G3
2951	G2
3200	F3
3201	F3
3210	D10
3211	D10
3212	D11
3213	C11
3250	H3
3261	E4
3262	F4
3427	A7
3428	A8
3429	B8
3430	A9
3432	A8
3903	F11
3904	E1
3905	I11
3907	C1
3910	C1
3928	C4
3929	D4
3930	D3
3938	F10
3939	G11
3940	G11
3941	E2
3942	E11
3943	E11
3944	C11
3945	F11
3999	A3
4915	I11
5901	C2
5902	A1
5903	A1
5904	H8
6200	G2
6201	G3
6202	G3
6402	B9
6901	A8
7210	D10
7211	D11
7901	C3
7902	F11
7908	E11
7910	B2
7911	D1
7912	C1
9201	C12
9203	C12
9205	E8
9206	D8
9215	G2
9225	E8
9226	D9
9228	A4
9229	A4
9250	E6
9251	E6
9292	B4
9901	C12
9902	C12
9903	D12
9904	C12
9905	F8
9906	E3
9907	C11
9908	C3
9909	B1
9980	B1
9982	F6
9983	C11
9987	B6
9988	B6
9989	B6
9990	B5
9998	I13
c001	H2
c002	I2

Large Signal Panel: Front

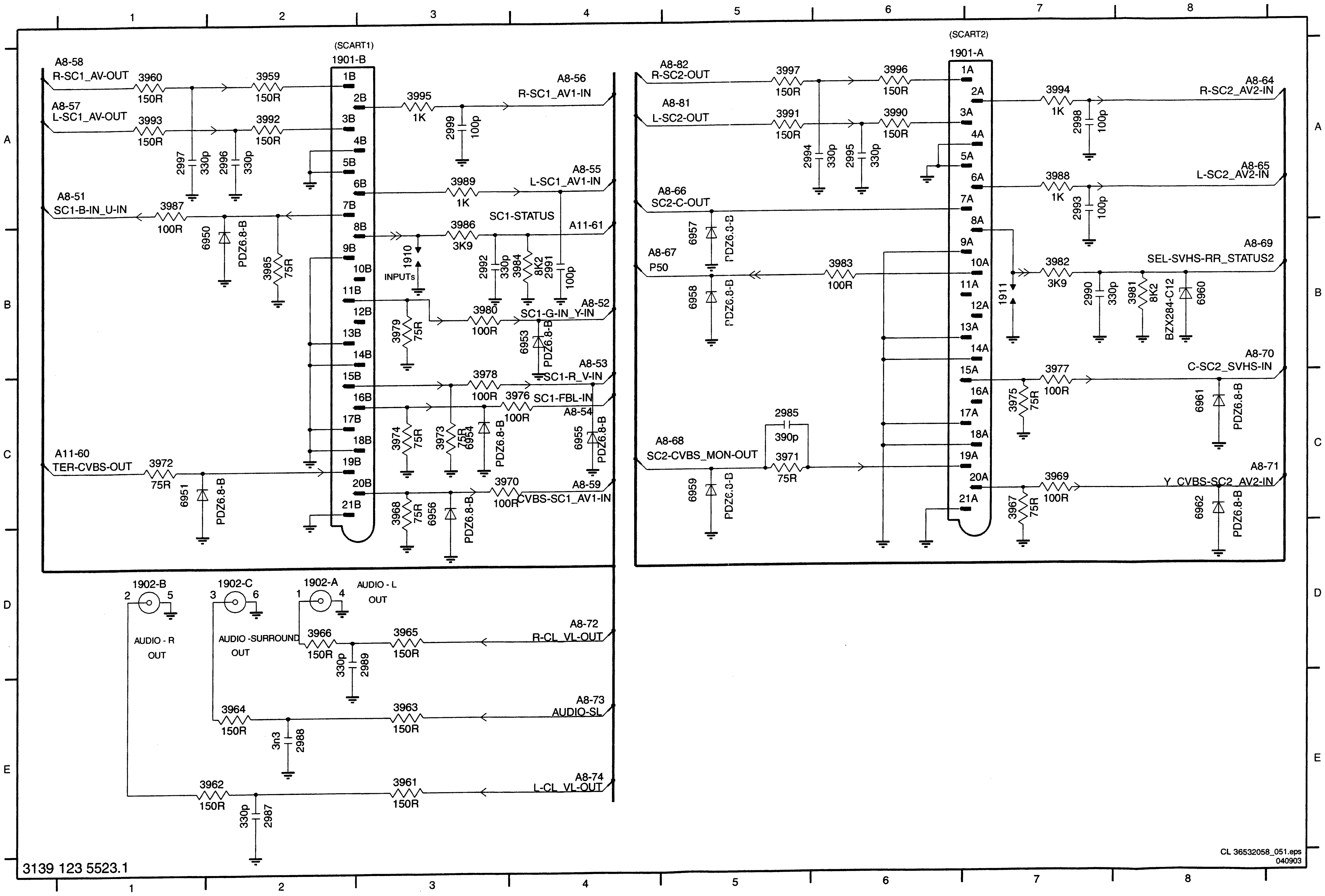

1
2
3
A
B
C
D
E
A10
FRONT
TO
0203
J
FRONT
INTERFACE
PANEL
1947
9978
KEYBOARD
A8-25
4914
ON-OFF-LED
A8-27
4912
RC
A8-24
4911
9970
+5.2V
9973
+8V
3911
10K
1949
NC
RC
A8-24
1946
1
2 2V
3 3V1
4 5V2
5 0V
6 0V
7 3V3
8 0V
9 8V2
ON-OFF-LED
A8-27
3914
1K
+5.2V
RCOUT
A8-24
KEYBOARD
A8-25
LIGHT-SENSOR
A8-31
3912
8K2
+8V
2952
1n
3913
10K
KEYBOARD
A8-25
1945
0V 1
3V3 2
0V 3
TO
0215
E
TOP CONTROL
PANEL
3139 123 5523.1
CL 36532058_050.eps
030903

1945	**E3**
1946	**B1**
1947	**A1**
1949	**B1**
2952	**D2**
3911	**B2**
3912	**D3**
3913	**D2**
3914	**C2**
4911	**A2**
4912	**A2**
4914	**A2**
9970	**A3**
9973	**B3**
9978	**A2**

Personal Notes:

Large Signal Panel: Inputs/Outputs

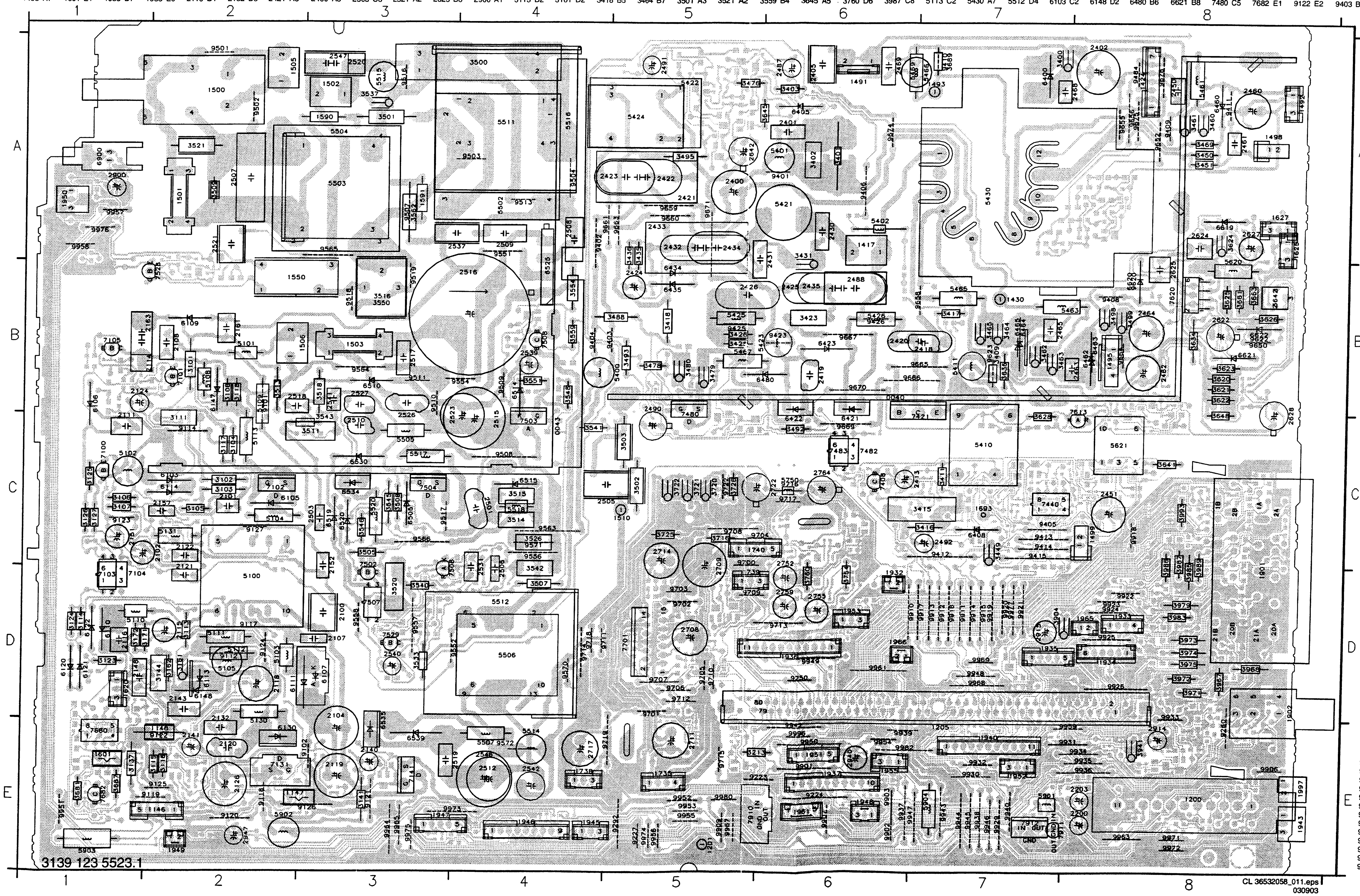
A 1 1 INPUTS/OUTPUTS


(SCART1)
1901-B
(SCART2)
1901-A
A8-58 R-SC1_AV-OUT
A8-57 L-SC1_AV-OUT
A8-51 SC1-B-IN_U-IN
A11-60 TER-CVBS-OUT
A8-56 R-SC1_AV1-IN
A8-55 L-SC1_AV1-IN
SC1-STATUS
A11-61
A8-52 SC1-G-IN_Y-IN
A8-53 SC1-R_V-IN
SC1-FBL-IN
A8-54
A8-59 CVBS-SC1_AV1-IN
1910 INPUTs
A8-82 R-SC2-OUT
A8-81 L-SC2-OUT
A8-66 SC2-C-OUT
A8-67 P50
A8-68 SC2-CVBS_MON-OUT
A8-64 R-SC2_AV2-IN
A8-65 L-SC2_AV2-IN
A8-69 SEL-SVHS-RR_STATUS2
A8-70 C-SC2_SVHS-IN
A8-71 Y_CVBS-SC2_AV2-IN
1911
1902-B AUDIO - R OUT
1902-C AUDIO -SURROUND OUT
1902-A AUDIO - L OUT
A8-72 R-CL_VL-OUT
A8-73 AUDIO-SL
A8-74 L-CL_VL-OUT
3139 123 5523.1
CL 36532058_051.eps 040903

1901-A	A6	3982	B7
1901-B	A2	3983	B6
1902-A	D2	3984	B4
1902-B	D1	3985	B2
1902-C	D2	3986	B3
1910	B3	3987	A1
1911	B7	3988	A7
2985	C5	3989	A3
2987	E2	3990	A6
2988	E2	3991	A5
2989	D3	3992	A2
2990	B7	3993	A1
2991	B4	3994	A7
2992	B3	3995	A3
2993	A7	3996	A6
2994	A5	3997	A5
2995	A6	6950	B1
2996	A2	6951	C1
2997	A1	6953	B4
2998	A7	6954	C3
2999	A3	6955	C4
3959	A2	6956	C3
3960	A1	6957	B5
3961	E3	6958	B5
3962	E2	6959	C5
3963	E3	6960	B8
3964	E2	6961	C8
3965	D3	6962	C8
3966	D2		
3967	C7		
3968	C3		
3969	C7		
3970	C3		
3971	C5		
3972	C1		
3973	C3		
3974	C3		
3975	C7		
3976	C4		
3977	C7		
3978	C3		
3979	B3		
3980	B3		
3981	B8		

Layout LSP (Top Side)

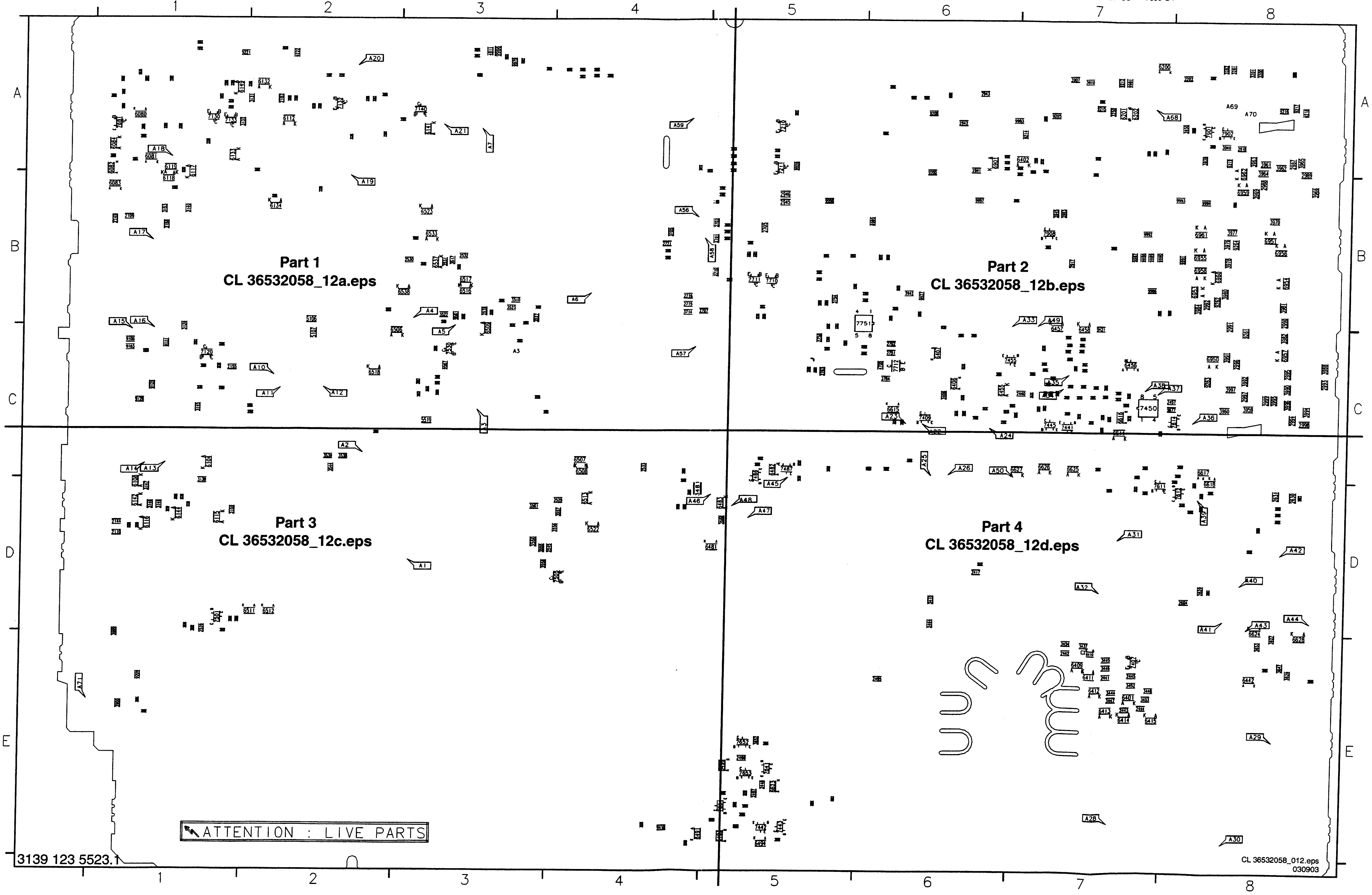
0040	B6
0043	C4
1146	E2
1147	E2
1148	E2
1200	E8
1201	E5
1205	E7
1417	A6
1424	A8
1430	B7
1491	A6
1492	A8
1493	A7
1495	B8
1498	A8
1499	C8
1500	A2
1501	A2
1502	A3
1503	B3
1505	A2
1506	B2
1510	C5
1550	B2
1590	A3
1591	A3
1601	E1
1620	D1
1625	A8
1627	A8
1693	C7
1735	E5
1738	E4
1739	D5
1740	C5
1901	D8
1902	D8
1932	D6
1933	D8
1934	D8
1935	D7
1936	D6
1937	E6
1940	E7
1943	E8
1945	E4
1946	E4
1947	E3
1948	E6
1949	E2
1950	A1
1951	E6
1952	E7
1953	D6
1955	E6
1961	E6
1965	D8
1966	D6
1997	E8
2100	D3
2101	C2
2102	C2
2104	D3
2107	D3
2108	B2
2111	C1
2114	B1
2115	D2
2116	D1
2118	D2
2119	E3
2120	E2
2121	D2
2122	C2
2124	B1
2126	E2
2132	E2
2140	E3
2141	E2
2143	D2
2148	D1
2151	C1
2152	D3
2157	C2
2161	B2
2163	B1
2200	E8
2203	E8
2400	A5
2401	A6
2402	A8
2405	A6
2413	C7
2418	B7
2419	B6
2420	B6
2421	A5
2422	A5
2423	A4
2424	B5
2425	B6
2426	B5
2430	A6
2431	A6
2432	A5
2433	A5
2434	A5
2435	B6
2450	A8
2451	C8
2460	A8
2461	A8
2462	B8
2463	B8
2464	B8
2465	B7
2468	A8
2469	A6
2487	A6
2488	B6
2490	B5
2491	A5
2492	C7
2501	C4
2503	C3
2505	C4
2506	D4
2507	A2
2508	A4
2509	A4
2510	C3
2512	E4
2515	C4
2516	B4
2517	B3
2518	B2
2519	E4
2520	A3
2521	A2
2523	C3
2526	C3
2527	B3
2531	D4
2537	A3
2539	B4
2540	D3
2541	B3
2542	E4
2546	E4
2547	A3
2622	B8
2624	A8
2625	B8
2627	A8
2628	B8
2642	A5
2708	D5
2709	C5
2711	E5
2714	C5
2717	E4
2722	C6
2752	C6
2755	D6
2759	D6
2764	C6
2900	A1
2914	E8
2915	D7
2940	E6
2947	E2
3101	B2
3102	C2
3103	C2
3104	C2
3105	C2
3106	C1
3107	C1
3108	B2
3111	C2
3113	D2
3114	D1
3115	E2
3116	E2
3117	C2
3118	B2
3123	D1
3124	D1
3125	C1
3126	C1
3127	C1
3137	E1
3141	E3
3144	D2
3161	D2
3162	D2
3171	D1
3172	D1
3213	E6
3400	A7
3401	A6
3402	A6
3403	A6
3409	B7
3411	C7
3415	C7
3416	C7
3417	B7
3418	B5
3423	B6
3425	B5
3426	B5
3431	A6
3435	A5
3436	A5
3449	C7
3450	A8
3451	A8
3460	A8
3461	A8
3462	B7
3463	B7
3464	B7
3465	B7
3469	A8
3476	A5
3478	B5
3479	B5
3480	B5
3488	B5
3492	C6
3493	B5
3495	A5
3498	B8
3499	B8
3500	A4
3501	A3
3502	C5
3503	C5
3505	C3
3507	D4
3508	C3
3509	A2
3511	C3
3513	B2
3514	C4
3515	C4
3516	B3
3518	B3
3520	D3
3521	A2
3526	C4
3533	D3
3537	A3
3540	D3
3541	C4
3542	D4
3543	C3
3545	C3
3546	C3
3548	B4
3550	B3
3551	B4
3554	B4
3559	B4
3562	A3
3620	B8
3621	B8
3622	B8
3623	B8
3624	A8
3625	B8
3626	B8
3628	C7
3634	B8
3635	B7
3641	C8
3642	B8
3645	A5
3648	B8
3661	B8
3663	B8
3681	E1
3687	E1
3689	A7
3716	C5
3720	C5
3721	C5
3722	C5
3725	C5
3726	C5
3754	D6
3760	D6
3904	D7
3941	E8
3967	D8
3968	D8
3971	D8
3972	D8
3973	D8
3974	D8
3975	D8
3979	D8
3983	D8
3985	D8
3986	C8
3987	C8
3989	C8
3993	C8
5100	D2
5101	B2
5102	C1
5103	D2
5104	C2
5105	D2
5108	B2
5109	B2
5110	D1
5111	D2
5112	D2
5113	C2
5130	E2
5131	C2
5400	B5
5401	A6
5402	A6
5410	C7
5411	B7
5421	A6
5422	A5
5423	B5
5424	A5
5425	B5
5426	B6
5430	A7
5461	A8
5463	B8
5465	B7
5466	A7
5467	B5
5469	A6
5502	A4
5503	A3
5504	A3
5505	C3
5506	D4
5507	E4
5511	A4
5512	D4
5514	E4
5515	A3
5516	A4
5517	C3
5518	C4
5520	C3
5620	A8
5621	C8
5750	C6
5901	E7
5902	E2
5903	E1
5904	E7
6103	C2
6105	C2
6106	B1
6107	D3
6109	B2
6110	D1
6111	D2
6113	D2
6114	C2
6120	D1
6121	D1
6122	D1
6130	E2
6147	B2
6148	D2
6400	A7
6405	A6
6408	C7
6421	C6
6422	C6
6423	B6
6434	B5
6435	B5
6460	A8
6462	B8
6463	B8
6464	B7
6465	B7
6480	B6
6505	C3
6510	B3
6514	B4
6515	C4
6519	C3
6520	C3
6525	B4
6530	C3
6534	C3
6535	E3
6539	E3
6619	A8
6620	B8
6621	B8
6622	B8
6900	A1
7100	C1
7101	B2
7102	C2
7103	D1
7104	D1
7105	B1
7131	E2
7141	E3
7408	C6
7421	C7
7440	C7
7480	C5
7482	C6
7483	C6
7502	C3
7503	C4
7504	C3
7506	D3
7507	D3
7508	B4
7528	B2
7529	D3
7613	B8
7620	B8
7680	E1
7682	E1
7701	D5
7910	E5
7911	E8
7912	E7
9101	B2
9102	E3
9112	D2
9114	C2
9117	D2
9118	E2
9119	E2
9120	E2
9121	E3
9122	E2
9123	C1
9124	D2
9125	E2
9126	E3
9127	C2
9223	E6
9224	E6
9227	E5
9250	D6
9260	E8
9292	E5
9401	A6
9402	A4
9403	B4
9404	B4
9405	C7
9406	A6
9408	B8
9409	A8
9410	A7
9411	A8
9412	C7
9413	C7
9414	C7
9415	C7
9423	B6
9425	B5
9426	B6
9484	A8
9501	A2
9502	A2
9503	A4
9504	A4
9507	A3
9508	C4
9509	B4
9510	B3
9511	B3
9513	A4
9516	A3
9517	C3
9518	B3
9519	B3
9551	A4
9552	D4
9554	B4
9556	C4
9557	D3
9558	D3
9563	C4
9564	B3
9565	A3
9566	C3
9570	D4
9571	C4
9572	E4
9620	B8
9622	B8
9623	B7
9650	B8
9652	A8
9655	A8
9656	A8
9658	B7
9659	A5
9660	A5
9661	A4
9663	A5
9664	B8
9665	B7
9666	B6
9667	B6
9669	C6
9670	B6
9671	A5
9674	A6
9675	A8
9678	A8
9700	C5
9701	D5
9702	D5
9703	D5
9704	C6
9705	D5
9706	D5
9707	D5
9708	C5
9709	D5
9710	D5
9711	D4
9712	D5
9713	D6
9714	D4
9715	E5
9716	C6
9717	C6
9718	D4
9719	E5
9722	C5
9901	E6
9902	E6
9903	E6
9906	E8
9907	E6
9909	E5
9910	D6
9911	D7
9912	D7
9913	D7
9914	D7
9915	D7
9916	D7
9917	D7
9918	C8
9919	D7
9920	D7
9921	D7
9922	D8
9923	D8
9924	D8
9925	D8
9926	D8
9929	E7
9930	E7
9931	E8
9932	E7
9933	D8
9934	E8
9935	E8
9936	E8
9937	E6
9938	E7
9939	E6
9940	E7
9942	E6
9943	E7
9944	E7
9945	E7
9946	E7
9947	E7
9948	D7
9949	D6
9950	E6
9951	E1
9952	E5
9953	E5
9954	E6
9955	E5
9956	E5
9957	A1
9958	A1
9959	E8
9961	D6
9963	E8
9964	E3
9965	E3
9967	E5
9968	D7
9969	D7
9971	E8
9972	E8
9973	E4
9974	E5
9975	E3
9976	A1
9977	D7
9980	E5
9982	E6
9996	E6



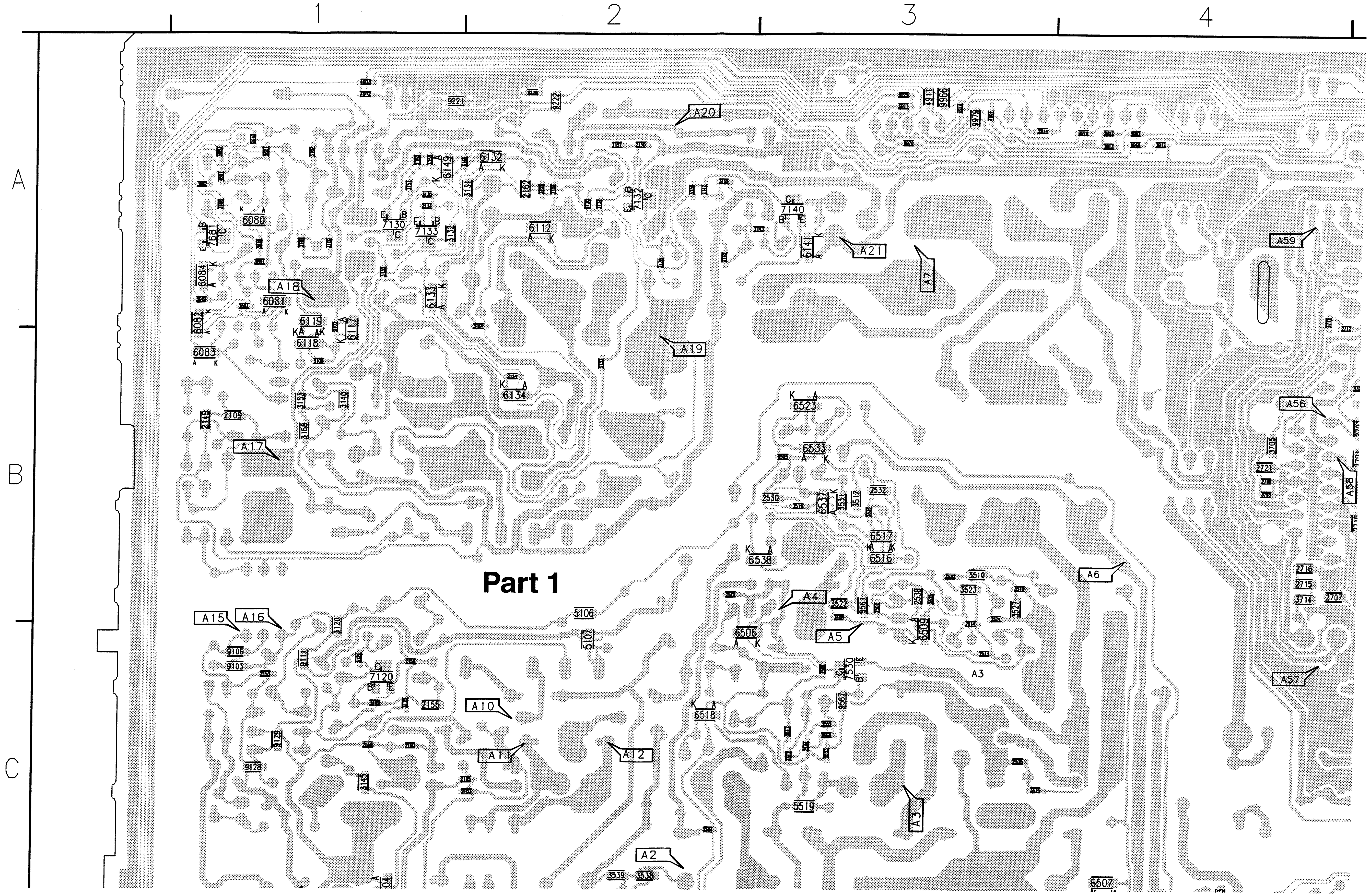
CL 36532058_011.eps
030903

Layout LSP (Overview Bottom Side)

0201 B5	1902 D7	1915 D6	1928 D5	1938 D4	1955 D3	1965 D2	1975 D2	2008 B7	2030 A6	2068 B7	2083 B7	2318 C4	2362 C3	2397 C5	3009 A7	3154 B7	3316 C4	3331 C4	3360 C3	3372 D3	3386 C4	3509 C5	4152 C7	6361 C2	6398 C5	7356 C5
0202 B5	1903 D7	1918 D6	1929 D5	1939 D4	1956 D3	1966 D2	1976 D2	2012 B5	2037 A5	2069 C7	2084 B7	2319 C4	2363 C3	2932 C5	3022 A5	3155 A7	3317 C4	3332 C4	3361 C3	3373 C3	3391 C5	3510 C5	4361 D3	6365 C3	7100 B6	7361 C2
0290 C2	1904 D6	1919 D6	1931 D5	1941 D4	1958 D3	1967 D2	1977 D2	2013 B6	2041 A7	2070 B7	2085 B7	2321 D4	2364 C3	2933 C5	3064 C7	3307 C3	3319 D4	3333 C4	3362 D3	3376 C3	3392 C5	3936 D6	4363 C2	6367 C3	7300 B3	7365 D3
0291 B2	1906 D6	1920 D5	1932 D5	1948 D3	1959 D3	1968 D2	1978 D2	2018 B6	2042 A7	2071 B7	2086 B7	2327 C4	2365 C3	2935 D5	3065 B7	3308 C4	3320 D4	3338 C4	3363 C3	3377 D3	3393 C5	3939 D6	4501 A2	6368 C3	7301 C3	7382 C4
1112 B5	1907 D6	1921 D5	1933 D5	1949 D3	1960 D3	1969 D2	1979 D1	2019 B5	2063 C7	2072 A7	2087 B7	2328 C4	2366 D3	2936 D5	3071 C7	3309 D3	3321 C4	3339 C4	3364 C3	3378 D3	3394 C5	4101 C6	5129 B5	6381 C5	7302 C4	7383 C5
1114 C6	1909 D6	1923 D5	1934 D5	1950 D3	1961 D3	1970 D2	1980 D1	2024 B6	2064 C7	2073 A7	2307 C3	2329 C4	2380 C5	3003 B5	3072 A7	3310 D4	3322 C4	3345 C6	3365 D3	3380 C5	3395 C5	4102 C6	5307 C4	6382 D5	7303 C4	7393 C5
1115 A7	1910 D6	1924 D5	1935 D5	1951 D3	1962 D3	1972 D2	2003 A5	2025 B5	2065 B7	2074 A7	2308 C4	2331 D4	2384 C5	3005 B5	3073 A7	3311 C3	3323 C4	3353 C5	3366 D3	3382 C4	3396 C5	4103 C6	5317 C4	6384 C5	7310 D3	7730 A2
1117 B7	1911 D6	1925 D5	1936 D4	1952 D3	1963 D2	1973 D2	2005 A6	2027 B6	2066 B7	2075 A7	2311 C4	2339 C4	2386 C4	3007 A5	3074 A7	3312 C3	3329 D4	3354 C5	3367 C3	3384 C5	3397 C5	4104 C6	5327 C4	6385 C4	7320 D4	7790 C2
1901 D7	1913 D6	1926 D5	1937 D4	1953 D3	1964 D2	1974 D2	2007 C7	2028 B5	2067 B7	2076 A7	2317 C4	2361 C3	2395 C5	3008 A7	3153 B7	3313 C3	3330 D4	3356 D5	3368 D3	3385 C5	3398 C5	4107 C6	6353 C5	6397 C5	7330 D4	

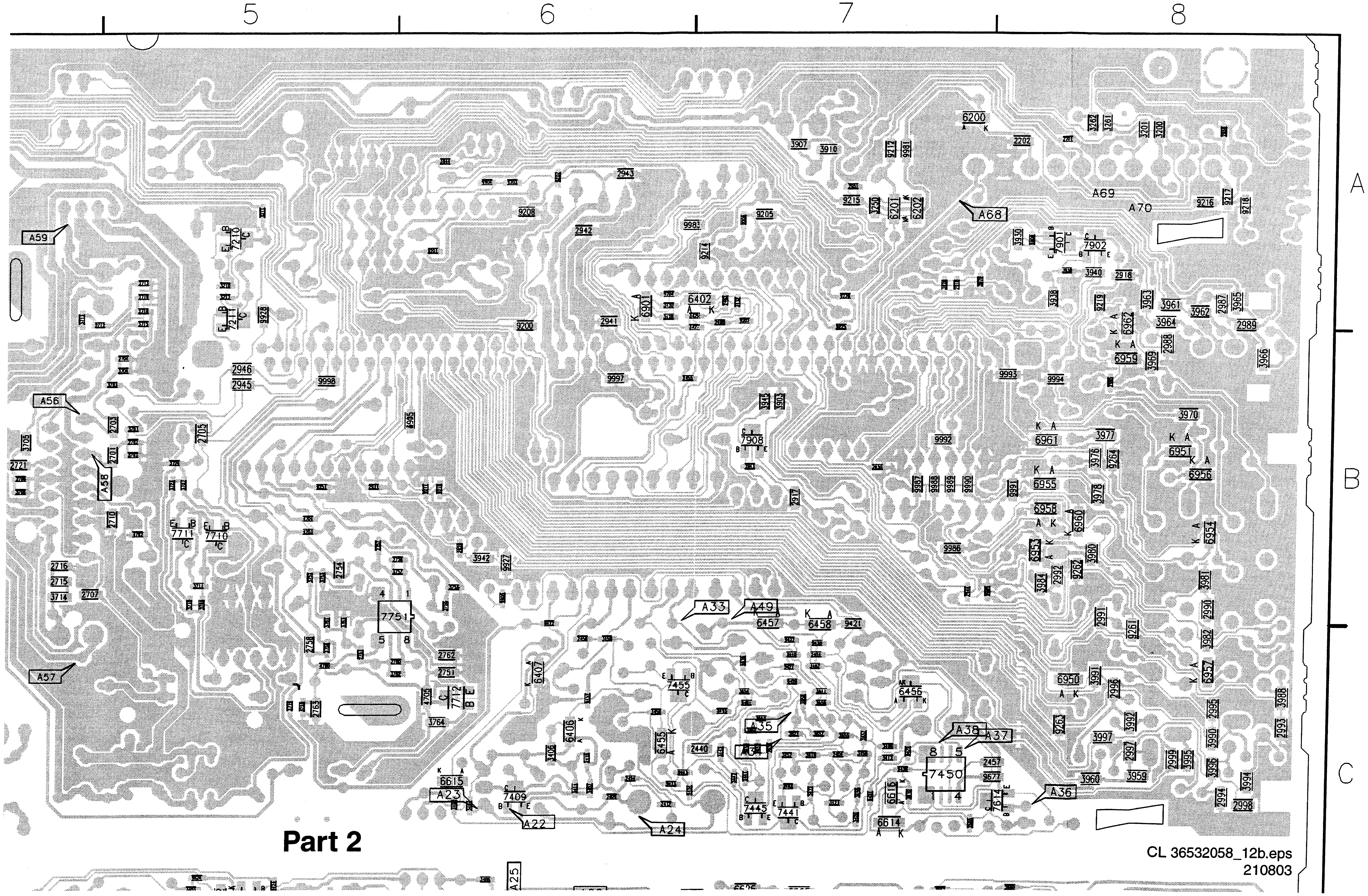


Layout LSP (Part 1 Bottom Side)


1
2
3
4
A
B
C
Part 1
9221
9222
A20
6132
6149
6080
7130
7133
7681
6112
7132
7140
6141
A21
A7
A59
6084
A18
6081
6082
6119
6118
6117
6133
6083
A19
6134
6523
A56
2109
A17
6533
2530
6537
2532
3705
2721
A58
6517
6516
6538
A6
2716
2715
3714
2707
5106
5107
A4
3522
3523
3510
6509
A15
A16
9105
9103
3120
7120
6506
A5
7530
A3
A57
2155
A10
9129
A11
A12
6518
9567
9128
5519
A2
3539
3538
6507

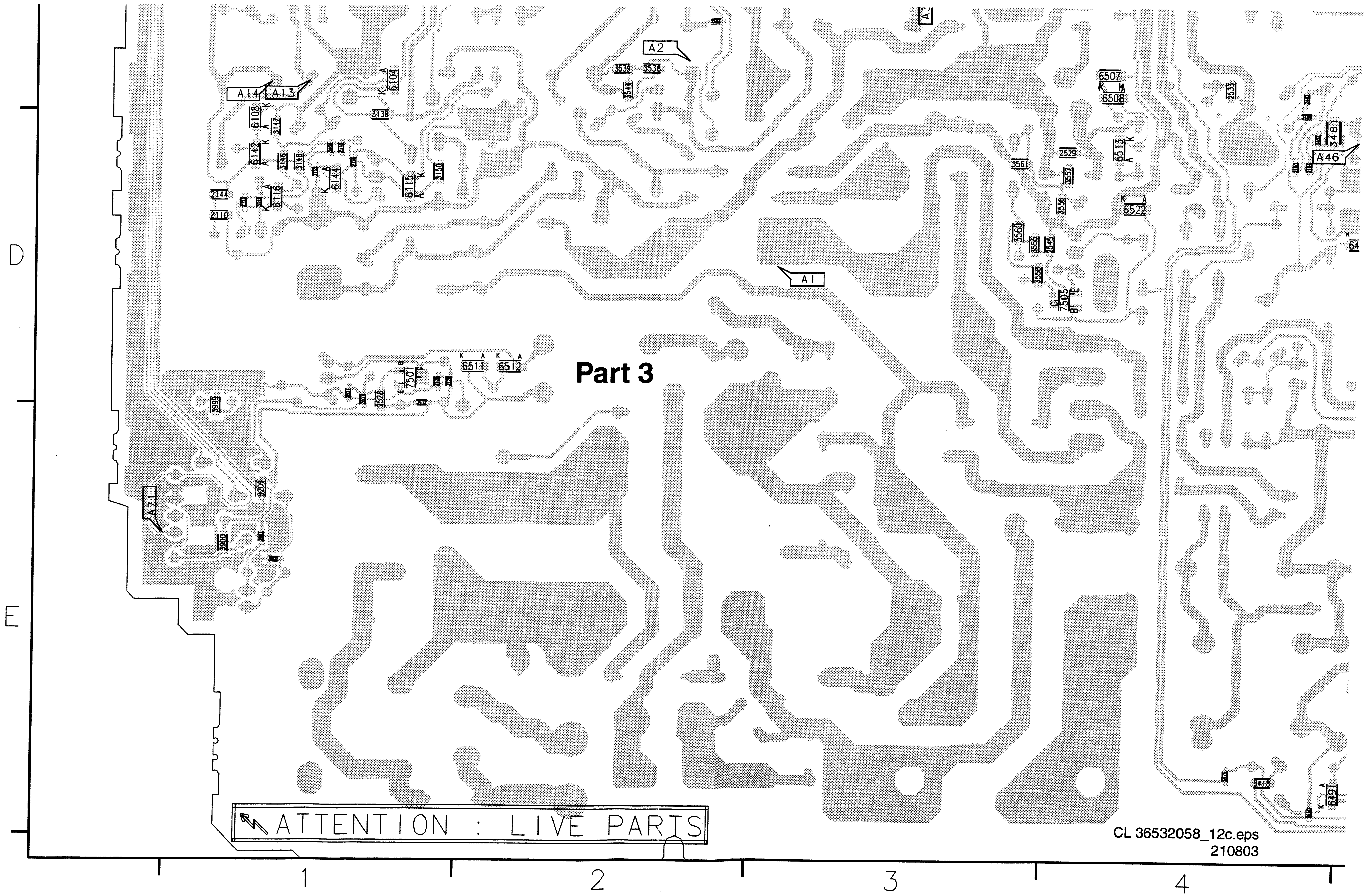
CL 36532058_12a.eps
210803

Layout LSP (Part 2 Bottom Side)


5
6
7
8
A
B
C
A59
A56
A58
A57
A68
A69
A70
A33
A49
A35
A34
A38
A37
A36
A23
A22
A24
A25
Part 2
6200
2202
3907
3910
9212
9981
9215
3250
6201
6202
2943
9208
2942
9205
9983
9214
6901
6402
2941
9200
7210
7211
3928
2946
2945
9998
9997
7901
7902
3930
3940
2918
3938
9219
6962
6959
3963
3961
3964
3962
2987
3965
2989
2988
3969
3966
9216
9217
9218
3201
3200
3262
3261
9993
9994
3970
3977
6961
3976
9264
6951
6956
6955
3978
6958
6960
6953
3980
3984
2992
9262
6954
3981
2990
2991
9261
3982
6957
6950
3991
2996
3988
2993
2995
3990
3997
3992
2997
2999
3995
3996
3994
3960
3959
2994
2998
9263
9992
3987
9988
9989
9990
3993
3986
2917
7908
3945
3903
3942
3927
2985
3705
2721
2703
2701
2705
2710
7711
7710
2716
2715
3714
2707
7751
2754
2756
2762
2751
2706
7712
3764
2763
6407
6406
3406
6455
2440
7455
6456
6457
6458
9421
7450
2457
9677
6616
6614
7614
7445
7441
7409
6615

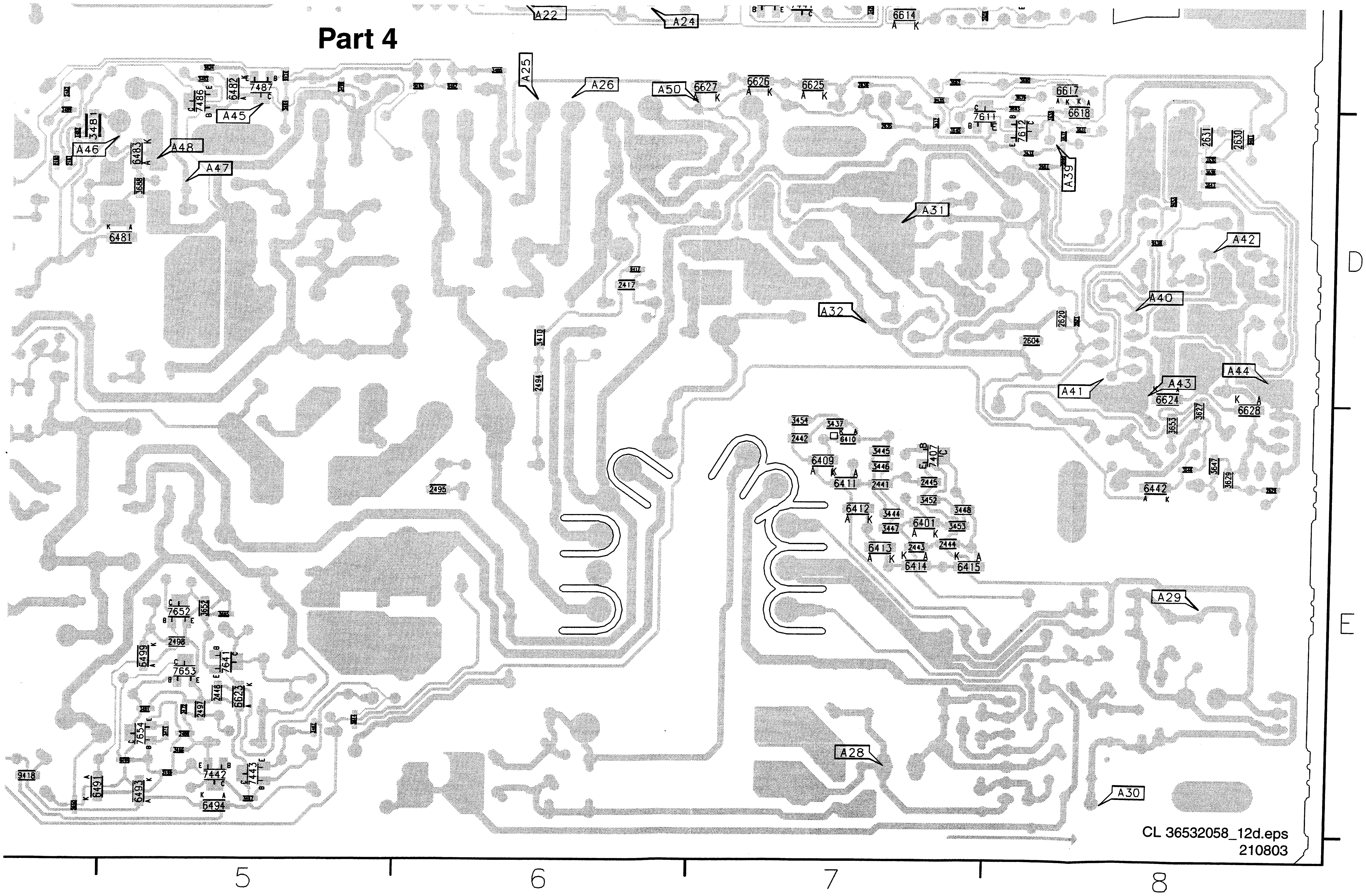
CL 36532058_12b.eps
210803

Layout LSP (Part 3 Bottom Side)


A14
A13
6104
6108
3138
6142
3147
3146
3148
6144
6115
3150
6116
2144
2110
A2
3539
3538
3544
A1
6507
6508
2533
3561
2529
6513
3557
3556
6522
3560
3555
2545
3558
7505
A46
6511
6512
7501
2528
3999
9209
A71
3900
9418
6491
Part 3
ATTENTION : LIVE PARTS
D
E
1
2
3
4

CL 36532058_12c.eps
210803

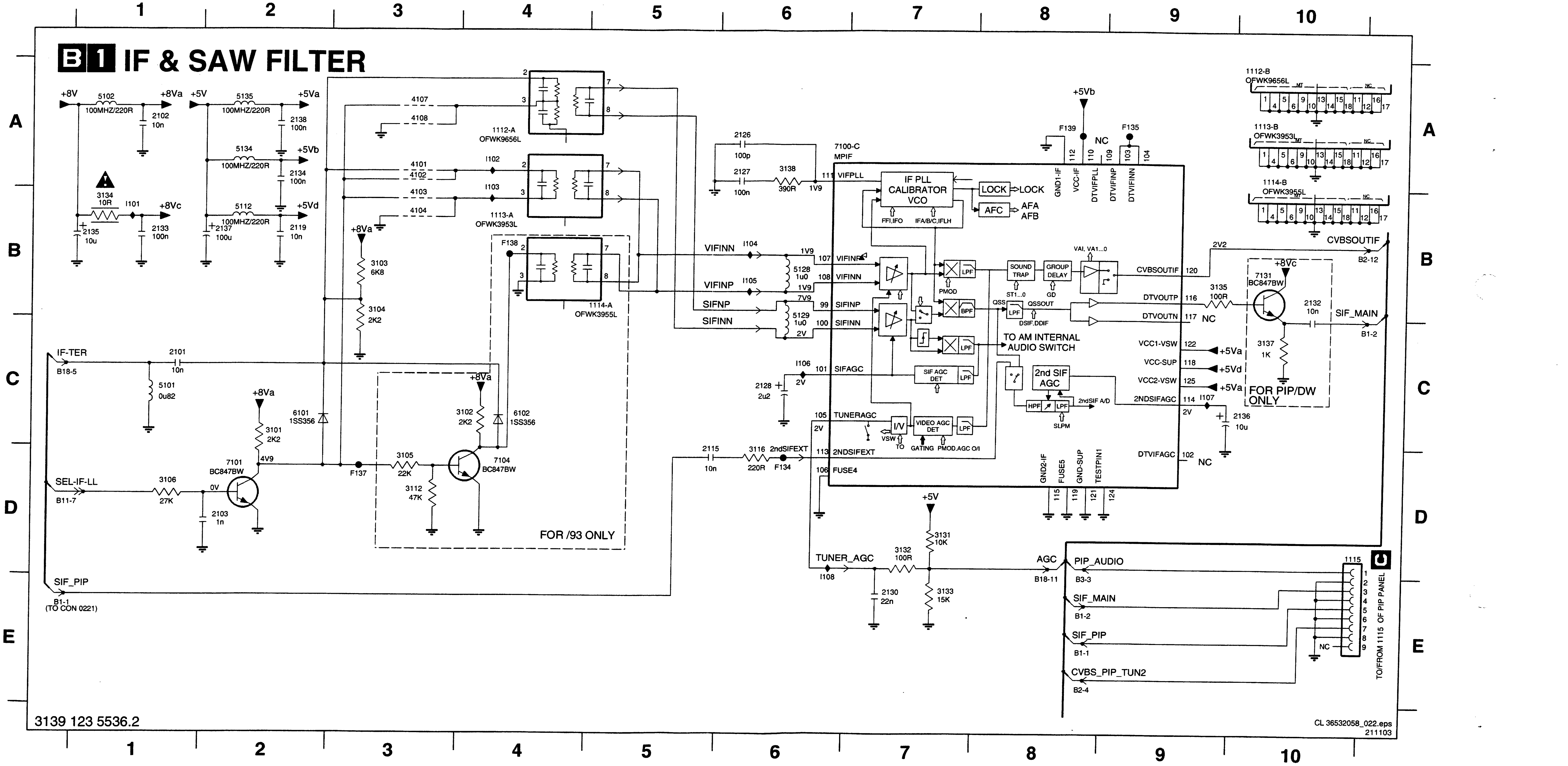
Layout LSP (Part 4 Bottom Side)


Part 4
A22
A24
6614
A25
A26
A50
6627
6626
6625
6617
6618
7611
7612
2631
2630
7486
6482
7487
A45
3481
A46
6483
A48
A47
3688
6481
A39
A31
A42
2417
A32
A40
2620
2604
3410
2494
A41
A43
6624
A44
6628
3454
3437
2442
6410
3445
7407
3446
6409
6411
2441
2445
3452
6412
3444
3448
3447
6401
3453
6413
2443
2444
6414
6415
3653
3627
3647
3629
6442
2495
A29
7652
3652
2498
6499
7653
7641
2416
6623
2497
7654
9418
6491
6493
7442
7443
6494
A28
A30
D
E
5
6
7
8

CL 36532058_12d.eps
210803

Small Signal Board: If & SAW Filter

1112-A	A4
1112-B	A10
1113-A	B4
1113-B	A10
1114-A	B5
1114-B	A10
1115	D10
2101	C1
2102	A1
2103	D2
2115	D5
2119	B2
2126	A6
2127	A6
2128	C6
2130	E7
2132	B10
2133	B1
2134	A2
2135	B1
2136	C10
2137	B2
2138	A2
3101	C2
3102	C4
3103	B3
3104	B3
3105	D3
3106	D1
3112	D3
3116	D6
3131	D7
3132	D7
3133	E7
3134	B1
3135	B9
3137	C10
3138	A6
4101	A3
4102	A3
4103	B3
4104	B3
4107	A3
4108	A3
5101	C1
5102	A1
5112	B2
5128	B6
5129	B6
5134	A2
5135	A2
6101	C2
6102	C4
7100-C	A6
7101	D2
7104	D4
7131	B10
F114	E10
F115	D10
F116	E10
F132	E10
F134	D6
F135	A9
F137	D3
F138	B4
F139	A8
I101	B1
I102	A4
I103	A4
I104	B6
I105	B6
I106	C6
I107	C9
I108	E6

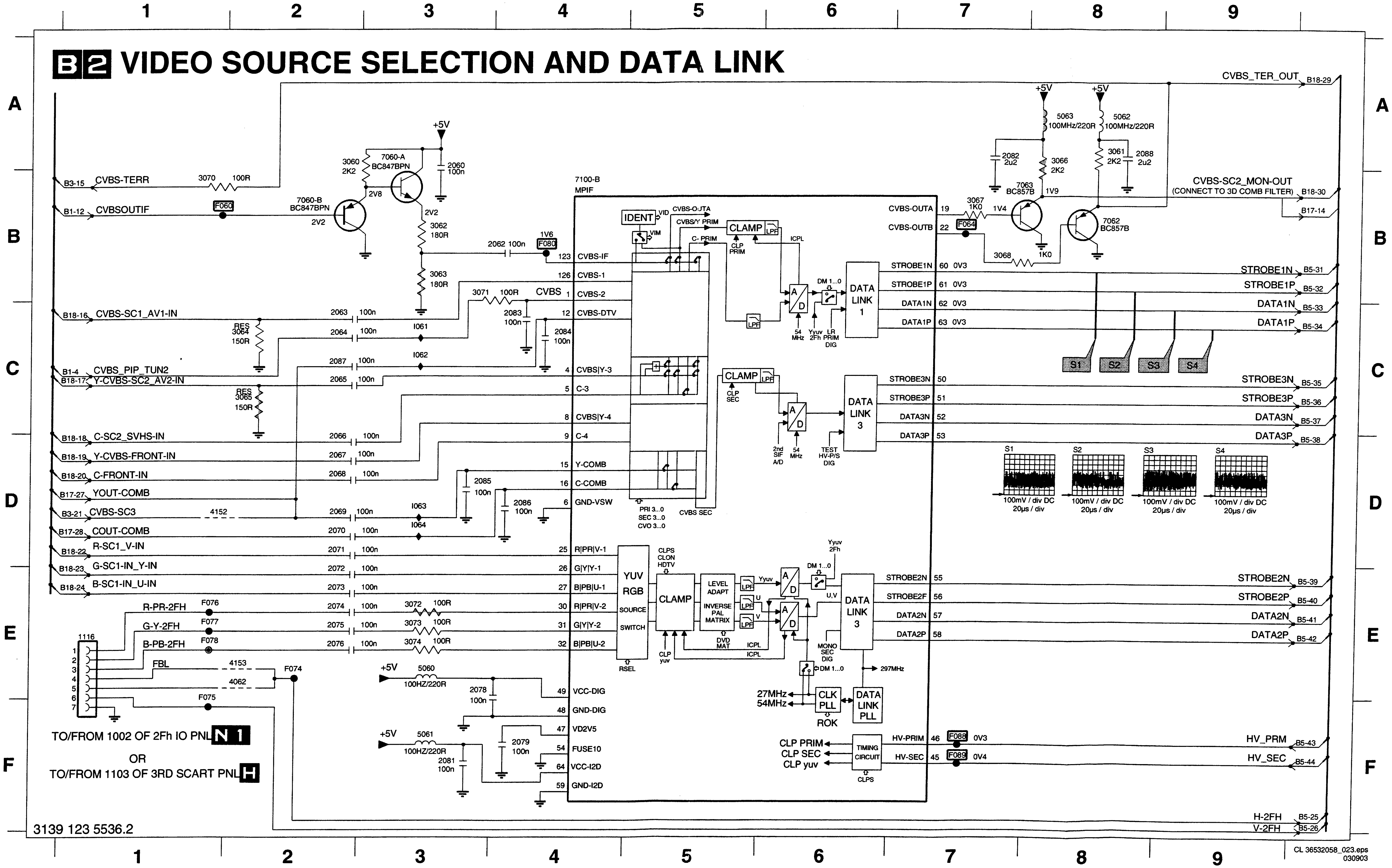


B1 IF & SAW FILTER
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
+8V
5102
100MHZ/220R
+8Va
2102
10n
+5V
5135
100MHZ/220R
+5Va
2138
100n
5134
100MHZ/220R
+5Vb
2134
100n
5112
100MHZ/220R
+5Vd
2119
10n
2137
100u
3134
10R
I101
+8Vc
2135
10u
2133
100n
4107
4108
4101
4102
4103
4104
I102
I103
1112-A
OFWK9656L
1113-A
OFWK3953L
1114-A
OFWK3955L
F138
+8Va
3103
6K8
3104
2K2
IF-TER
B18-5
2101
10n
5101
0u82
SEL-IF-LL
B11-7
3106
27K
0V
2103
1n
7101
BC847BW
+8Va
3101
2K2
4V9
6101
1SS356
F137
3105
22K
3112
47K
+8Va
3102
2K2
6102
1SS356
7104
BC847BW
FOR /93 ONLY
SIF_PIP
B1-1
(TO CON 0221)
2126
100p
2127
100n
3138
390R
1V9
7100-C
MPIF
111 VIFPLL
IF PLL CALIBRATOR VCO
FFI,IFO
IFA/B/C,IFLH
LOCK
LOCK
AFC
AFA
AFB
+5Vb
F139
NC
F135
112
110
109
103
104
GND1-IF
VCC-IF
DTVIFPLL
DTVIFINP
DTVIFINN
VIFINN
I104
VIFINP
I105
1V9
107 VIFINP
5128
1u0
108 VIFINN
SIFNP
SIFINN
7V9
99 SIFINP
5129
1u0
2V
100 SIFINN
PMOD
LPF
BPF
SOUND TRAP
GROUP DELAY
ST1...0
GD
VAI, VA1...0
QSS
QSSOUT
DSIF,DDIF
TO AM INTERNAL AUDIO SWITCH
CVBSOUTIF 120
DTVOUTP 116
DTVOUTN 117 NC
VCC1-VSW 122
VCC-SUP 118
VCC2-VSW 125
2NDSIFAGC 114
I107
DTVIFAGC 102 NC
I106
101 SIFAGC
2128
2u2
2V
SIF AGC DET
2nd SIF AGC
HPF
2ndSIF A/D
SLPM
105 TUNERAGC
I/V
VSW
TO
VIDEO AGC DET
GATING
PMOD,AGC O/I
2115
10n
3116
220R
2ndSIFEXT
F134
113 2NDSIFEXT
106 FUSE4
GND2-IF
FUSE5
GND-SUP
TESTPIN1
115
119
121
124
+5V
3131
10K
TUNER_AGC
I108
3132
100R
2130
22n
3133
15K
AGC
B18-11
+5Va
+5Vd
+5Va
2V
2136
10u
2V2
CVBSOUTIF
B2-12
+8Vc
7131
BC847BW
3135
100R
2132
10n
SIF_MAIN
B1-2
3137
1K
FOR PIP/DW ONLY
1112-B
OFWK9656L
1113-B
OFWK3953L
1114-B
OFWK3955L
NC
PIP_AUDIO
B3-3
SIF_MAIN
B1-2
SIF_PIP
B1-1
CVBS_PIP_TUN2
B2-4
1115
C
1
2
3
4
5
6
7
8
9
NC
TO/FROM 1115 OF PIP PANEL
3139 123 5536.2
CL 36532058_022.eps
211103

Small Signal Board: Video Source Selection & Data Link

1116 E1
2060 A3
2062 B4
2063 C2
2064 C2
2065 C2
2066 D2
2067 D2
2068 D2
2069 D2
2070 D2
2071 D2
2072 E2
2073 E2
2074 E2
2075 E2
2076 E2
2078 E3
2079 F4
2081 F3
2082 A7
2083 C4
2084 C4
2085 D3
2086 D4
2087 C2
2088 A8
3060 A2
3061 A8
3062 B3
3063 B3
3064 C2
3065 C2
3066 A8
3067 B7
3068 B7
3070 B1
3071 B3
3072 E3
3073 E3
3074 E3
4062 E2
4152 D1
4153 E2
5060 E3
5061 F3
5063 A8
7060-A A3
7060-B B2
7062 B8
7063 B7
7100-B B4
F060 B1
F064 B7
F074 E2
F075 F1
F076 E1
F077 E1
F078 E1
F080 B4
F088 F7
F089 F7
I061 C3
I062 C3
I063 D3
I064 D3

B2 VIDEO SOURCE SELECTION AND DATA LINK

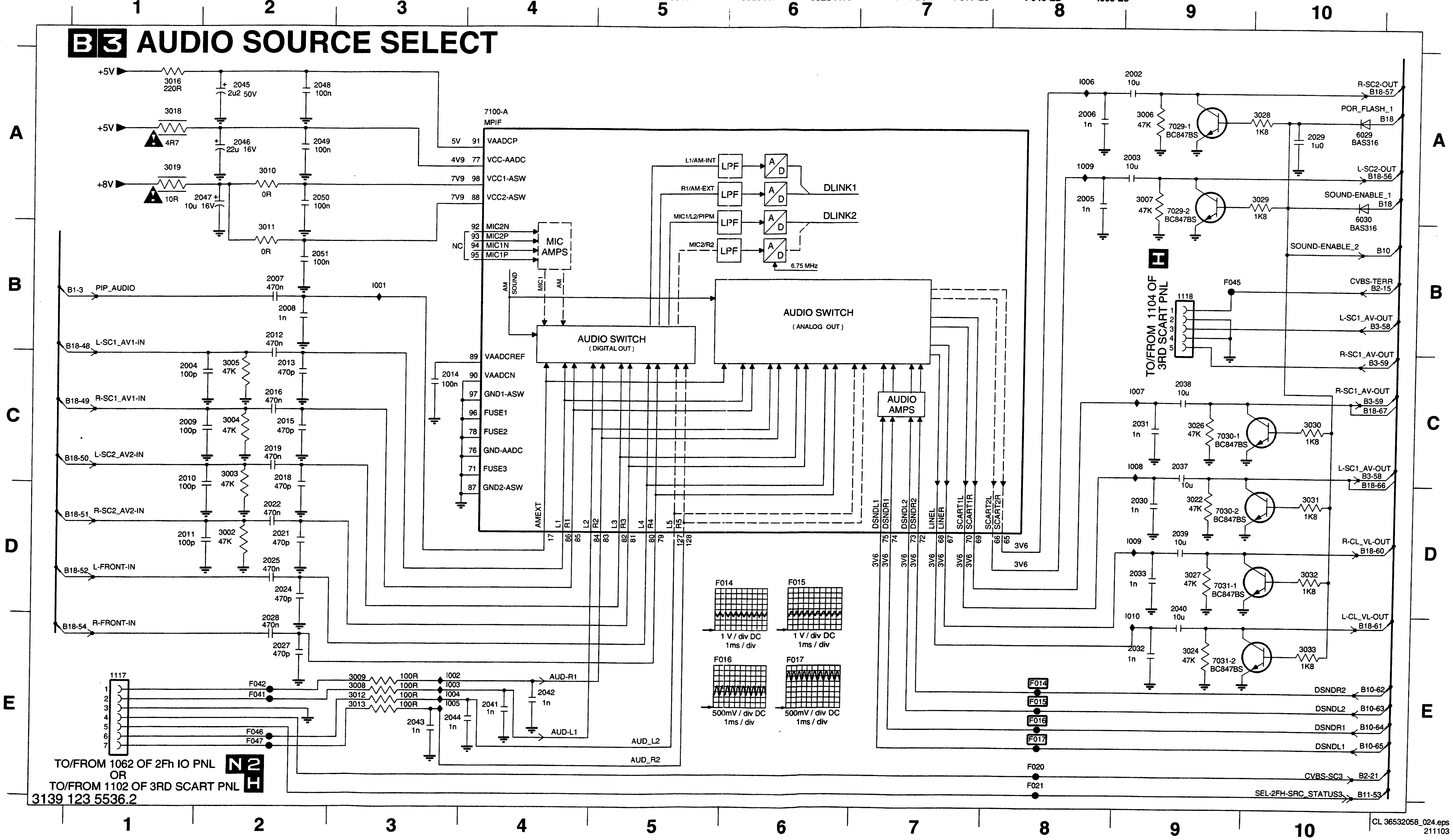


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
CVBS_TER_OUT
B18-29
+5V
5063
100MHz/220R
5062
100MHz/220R
2082
2u2
3066
2K2
3061
2K2
2088
2u2
7063
BC857B
1V9
CVBS-SC2_MON-OUT
(CONNECT TO 3D COMB FILTER)
B18-30
B17-14
3067
1K0
1V4
7062
BC857B
3068
1K0
B3-15
CVBS-TERR
3070
100R
3060
2K2
7060-A
BC847BPN
2060
100n
2V8
B1-12
CVBSOUTIF
F060
7060-B
BC847BPN
2V2
3062
180R
2062 100n
1V6
F080
3063
180R
7100-B
MPIF
IDENT
VID
VIM
CVBS-OUTA
CVBS/Y PRIM
C- PRIM
CLAMP
LPF
CLP
PRIM
ICPL
CVBS-OUTA
19
CVBS-OUTB
22
F064
123
CVBS-IF
126
CVBS-1
3071
100R
CVBS
1
CVBS-2
2083
100n
12
CVBS-DTV
2084
100n
B18-16
CVBS-SC1_AV1-IN
2063
100n
RES
3064
150R
2064
100n
I061
2087
100n
I062
B1-4
CVBS_PIP_TUN2
B18-17
Y-CVBS-SC2_AV2-IN
2065
100n
RES
3065
150R
4
CVBS|Y-3
5
C-3
8
CVBS|Y-4
9
C-4
15
Y-COMB
16
C-COMB
6
GND-VSW
B18-18
C-SC2_SVHS-IN
2066
100n
B18-19
Y-CVBS-FRONT-IN
2067
100n
B18-20
C-FRONT-IN
2068
100n
2085
100n
B17-27
YOUT-COMB
2086
100n
B3-21
CVBS-SC3
4152
2069
100n
I063
I064
B17-28
COUT-COMB
2070
100n
PRI 3...0
SEC 3...0
CVO 3...0
CVBS SEC
A
D
54 MHz
Yyuv 2Fh
LR PRIM DIG
DM 1...0
DATA LINK 1
STROBE1N
60
0V3
STROBE1P
61
0V3
DATA1N
62
0V3
DATA1P
63
0V3
STROBE1N
B5-31
STROBE1P
B5-32
DATA1N
B5-33
DATA1P
B5-34
S1
S2
S3
S4
CLAMP
LPF
CLP SEC
2nd SIF A/D
54 MHz
TEST HV-P/S DIG
DATA LINK 3
STROBE3N
50
STROBE3P
51
DATA3N
52
DATA3P
53
STROBE3N
B5-35
STROBE3P
B5-36
DATA3N
B5-37
DATA3P
B5-38
100mV / div DC
20µs / div
B18-22
R-SC1_V-IN
2071
100n
25
R|PR|V-1
B18-23
G-SC1-IN_Y-IN
2072
100n
26
G|Y|Y-1
B18-24
B-SC1-IN_U-IN
2073
100n
27
B|PB|U-1
YUV
RGB
SOURCE
SWITCH
RSEL
CLPS
CLON
HDTV
CLAMP
LEVEL ADAPT
INVERSE PAL MATRIX
DVD MAT
ICPL
CLP yuv
Yyuv
U
V
Yyuv 2Fh
DM 1...0
U,V
DATA LINK 3
MONO SEC DIG
DM 1...0
297MHz
STROBE2N
55
STROBE2F
56
DATA2N
57
DATA2P
58
STROBE2N
B5-39
STROBE2P
B5-40
DATA2N
B5-41
DATA2P
B5-42
R-PR-2FH
F076
2074
100n
3072
100R
30
R|PR|V-2
G-Y-2FH
F077
2075
100n
3073
100R
31
G|Y|Y-2
B-PB-2FH
F078
2076
100n
3074
100R
32
B|PB|U-2
1116
FBL
4153
4062
F074
F075
+5V
5060
100HZ/220R
2078
100n
49
VCC-DIG
48
GND-DIG
47
VD2V5
+5V
5061
100HZ/220R
2079
100n
2081
100n
54
FUSE10
64
VCC-I2D
59
GND-I2D
27MHz
54MHz
CLK PLL
ROK
DATA LINK PLL
CLP PRIM
CLP SEC
CLP yuv
TIMING CIRCUIT
CLPS
HV-PRIM
46
F088
0V3
HV-SEC
45
F089
0V4
HV_PRM
B5-43
HV_SEC
B5-44
TO/FROM 1002 OF 2Fh IO PNL N1
OR
TO/FROM 1103 OF 3RD SCART PNL H
H-2FH
B5-25
V-2FH
B5-26
3139 123 5536.2

CL 36532058_023.eps
030903

Small Signal Board: Audio Source Select

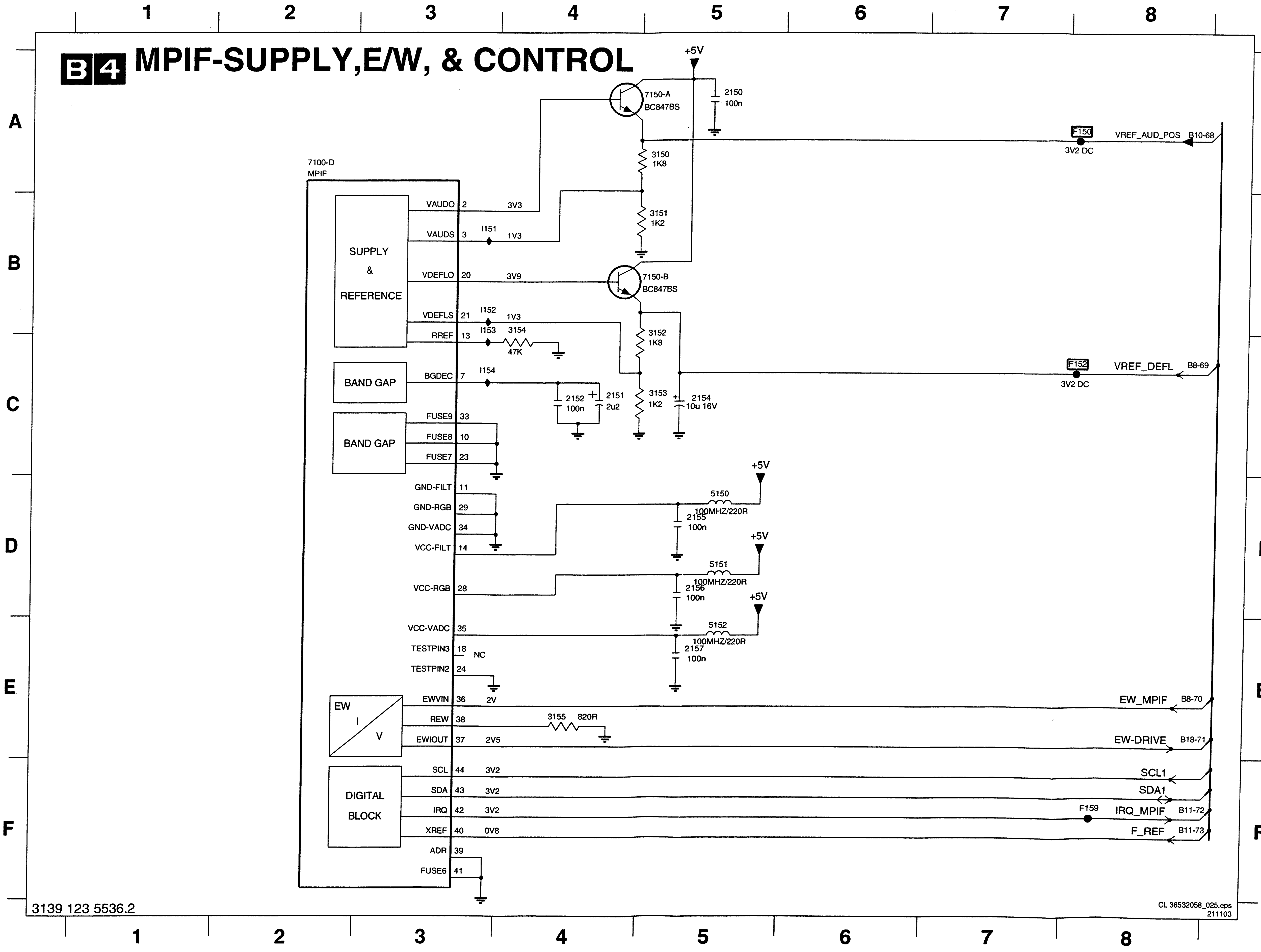
1009	A8
1117	E1
1118	B9
2002	A9
2003	A9
2004	C1
2005	A8
2006	A8
2007	B2
2008	B2
2009	C1
2010	C1
2011	D1
2012	B2
2013	C2
2014	C3
2015	C2
2016	C2
2018	C2
2019	C2
2021	D2
2022	D2
2024	D2
2025	D2
2027	E2
2028	E2
2029	A10
2030	D9
2031	C9
2032	E9
2033	D9
2037	C9
2038	C9
2039	D9
2040	D9
2041	E4
2042	E4
2043	E3
2044	E3
2045	A2
2046	A2
2047	A2
2048	A2
2049	A2
2050	A2
2051	B2
3002	D2
3003	C2
3004	C2
3005	C2
3006	A9
3007	A9
3008	E3
3009	E3
3010	A2
3011	B2
3012	E3
3013	E3
3016	A1
3018	A1
3019	A1
3022	D9
3024	E9
3026	C9
3027	D9
3028	A10
3029	A10
3030	C10
3031	D10
3032	D10
3033	E10
6029	A10
6030	A10
7029-1	A9
7029-2	A9
7030-1	C9
7030-2	D9
7031-1	D9
7031-2	E9
7100-A	A4
F014	E8
F015	E8
F016	E8
F017	E8
F020	E8
F021	E8
F041	E2
F042	E2
F045	B10
F046	E2
F047	E2
I001	B3
I002	E3
I003	E3
I004	E3
I005	E3
I006	A8
I007	C9
I008	C9
I009	D9
I010	D9



B3 AUDIO SOURCE SELECT
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
+5V
+5V
+8V
3016 220R
3018 4R7
3019 10R
2045 2u2 50V
2046 22u 16V
2047 10u 16V
2048 100n
2049 100n
2050 100n
2051 100n
3010 0R
3011 0R
7100-A MPIF
5V 91 VAADCP
4V9 77 VCC-AADC
7V9 98 VCC1-ASW
7V9 88 VCC2-ASW
92 MIC2N
93 MIC2P
94 MIC1N
95 MIC1P
NC
MIC AMPS
89 VAADCREF
90 VAADCN
97 GND1-ASW
96 FUSE1
78 FUSE2
76 GND-AADC
71 FUSE3
87 GND2-ASW
2014 100n
L1/AM-INT
R1/AM-EXT
MIC1/L2/PIPM
MIC2/R2
LPF
A D
DLINK1
DLINK2
6.75 MHz
AM
SOUND
MIC1
AM
AUDIO SWITCH (DIGITAL OUT)
AUDIO SWITCH (ANALOG OUT)
AUDIO AMPS
AMEXT L1 R1 L2 R2 L3 R3 L4 R4 L5 R5
17 86 85 84 83 82 81 80 79 127 128
DSNDL1 DSNDR1 DSNDL2 DSNDR2 LINEL LINER SCART1L SCART1R SCART2L SCART2R
75 74 73 72 68 67 70 69 66 65
3V6
B1-3 PIP_AUDIO
2007 470n
2008 1n
I001
B18-48 L-SC1_AV1-IN
2012 470n
2004 100p
3005 47K
2013 470p
B18-49 R-SC1_AV1-IN
2016 470n
2009 100p
3004 47K
2015 470p
B18-50 L-SC2_AV2-IN
2019 470n
2010 100p
3003 47K
2018 470p
B18-51 R-SC2_AV2-IN
2022 470n
2011 100p
3002 47K
2021 470p
B18-52 L-FRONT-IN
2025 470n
2024 470p
B18-54 R-FRONT-IN
2028 470n
2027 470p
1117
F042
F041
F046
F047
3009 100R
3008 100R
3012 100R
3013 100R
I002
I003
I004
I005
AUD-R1
AUD-L1
AUD_L2
AUD_R2
2041 1n
2042 1n
2043 1n
2044 1n
TO/FROM 1062 OF 2Fh IO PNL N2
OR
TO/FROM 1102 OF 3RD SCART PNL H
3139 123 5536.2
F014
F015
F016
F017
1 V / div DC 1ms / div
1 V / div DC 1ms / div
500mV / div DC 1ms / div
500mV / div DC 1ms / div
I006
2002 10u
2006 1n
3006 47K
7029-1 BC847BS
3028 1K8
2029 1u0
6029 BAS316
R-SC2-OUT B18-57
POR_FLASH_1 B18
I009
2003 10u
2005 1n
3007 47K
7029-2 BC847BS
3029 1K8
6030 BAS316
L-SC2-OUT B18-56
SOUND-ENABLE_1 B18
SOUND-ENABLE_2 B10
H
TO/FROM 1104 OF 3RD SCART PNL
1118
F045
CVBS-TERR B2-15
L-SC1_AV-OUT B3-58
R-SC1_AV-OUT B3-59
I007
2038 10u
2031 1n
3026 47K
7030-1 BC847BS
3030 1K8
R-SC1_AV-OUT B3-59 B18-67
I008
2037 10u
2030 1n
3022 47K
7030-2 BC847BS
3031 1K8
L-SC1_AV-OUT B3-58 B18-66
I009
2039 10u
2033 1n
3027 47K
7031-1 BC847BS
3032 1K8
R-CL_VL-OUT B18-60
I010
2040 10u
2032 1n
3024 47K
7031-2 BC847BS
3033 1K8
L-CL_VL-OUT B18-61
DSNDR2 B10-62
DSNDL2 B10-63
DSNDR1 B10-64
DSNDL1 B10-65
F020
CVBS-SC3 B2-21
F021
SEL-2FH-SRC_STATUS3 B11-53

CL 36532058_024.eps
211103

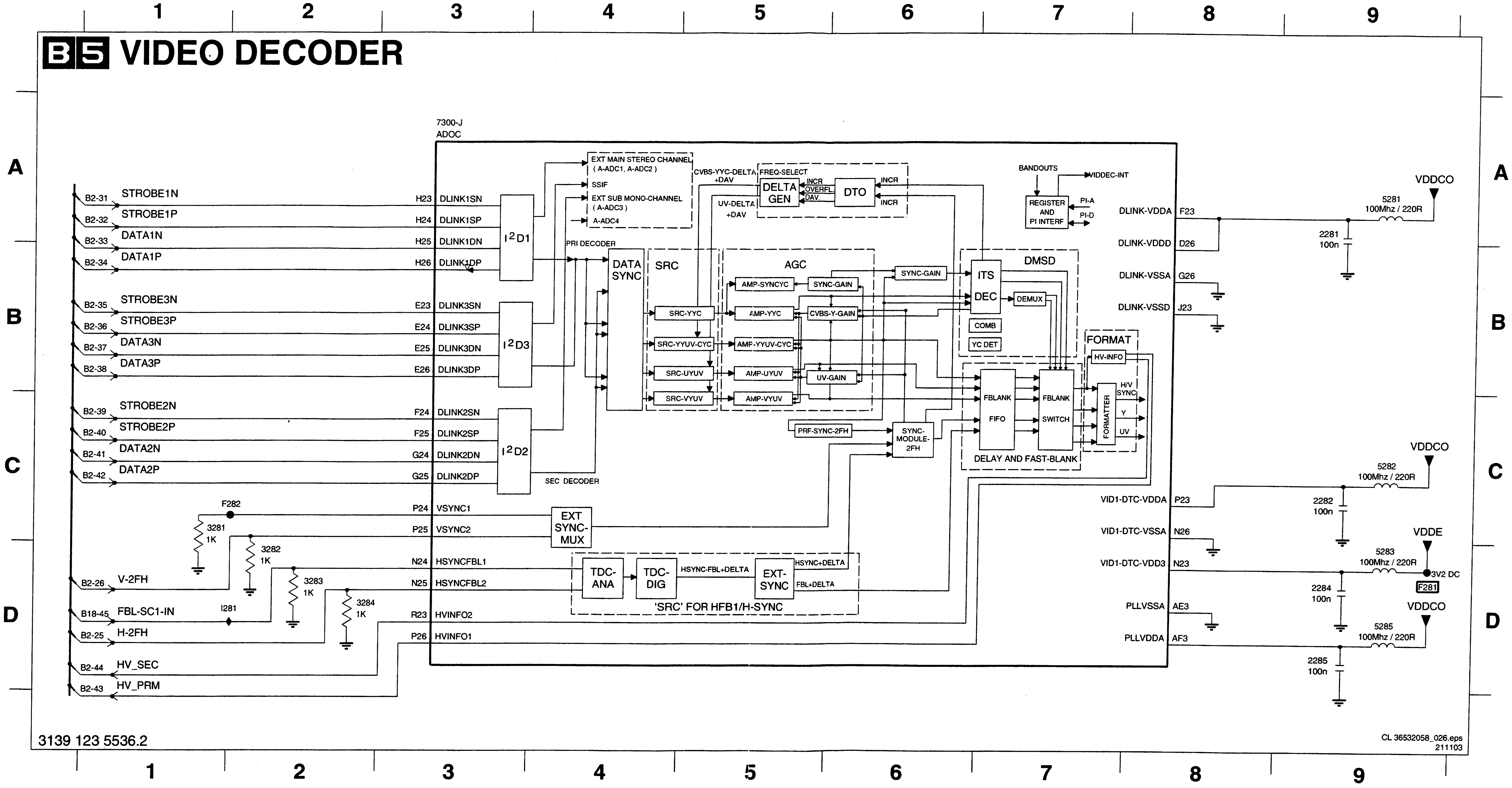
Small Signal Board: MPIF-Supply, E/W, & Control


B4 MPIF-SUPPLY,E/W, & CONTROL
1 2 3 4 5 6 7 8
A B C D E F
+5V
7150-A
BC847BS
2150
100n
3150
1K8
3151
1K2
7150-B
BC847BS
3152
1K8
3153
1K2
2154
10u 16V
7100-D
MPIF
SUPPLY & REFERENCE
VAUDO 2 3V3
VAUDS 3 I151 1V3
VDEFLO 20 3V9
VDEFLS 21 I152 1V3
RREF 13 I153 3154 47K
BAND GAP
BGDEC 7 I154
2152 100n
2151 2u2
BAND GAP
FUSE9 33
FUSE8 10
FUSE7 23
GND-FILT 11
GND-RGB 29
GND-VADC 34
VCC-FILT 14
VCC-RGB 28
VCC-VADC 35
TESTPIN3 18 NC
TESTPIN2 24
5150 100MHZ/220R
2155 100n
5151 100MHZ/220R
2156 100n
5152 100MHZ/220R
2157 100n
EW I V
EWVIN 36 2V
REW 38
3155 820R
EWIOUT 37 2V5
DIGITAL BLOCK
SCL 44 3V2
SDA 43 3V2
IRQ 42 3V2
XREF 40 0V8
ADR 39
FUSE6 41
F150 3V2 DC VREF_AUD_POS B10-68
F152 3V2 DC VREF_DEFL B8-69
EW_MPIF B8-70
EW-DRIVE B18-71
SCL1
SDA1
F159 IRQ_MPIF B11-72
F_REF B11-73
3139 123 5536.2
CL 36532058_025.eps 211103

2150	A5
2151	C4
2152	C4
2154	C5
2155	D5
2156	D5
2157	E5
3150	A5
3151	B5
3152	B5
3153	C5
3154	B4
3155	E4
5150	D5
5151	D5
5152	E5
7100-D	A2
7150-A	A5
7150-B	B5
F150	A8
F152	C8
F159	F8
I151	B3
I152	B3
I153	B3
I154	C3

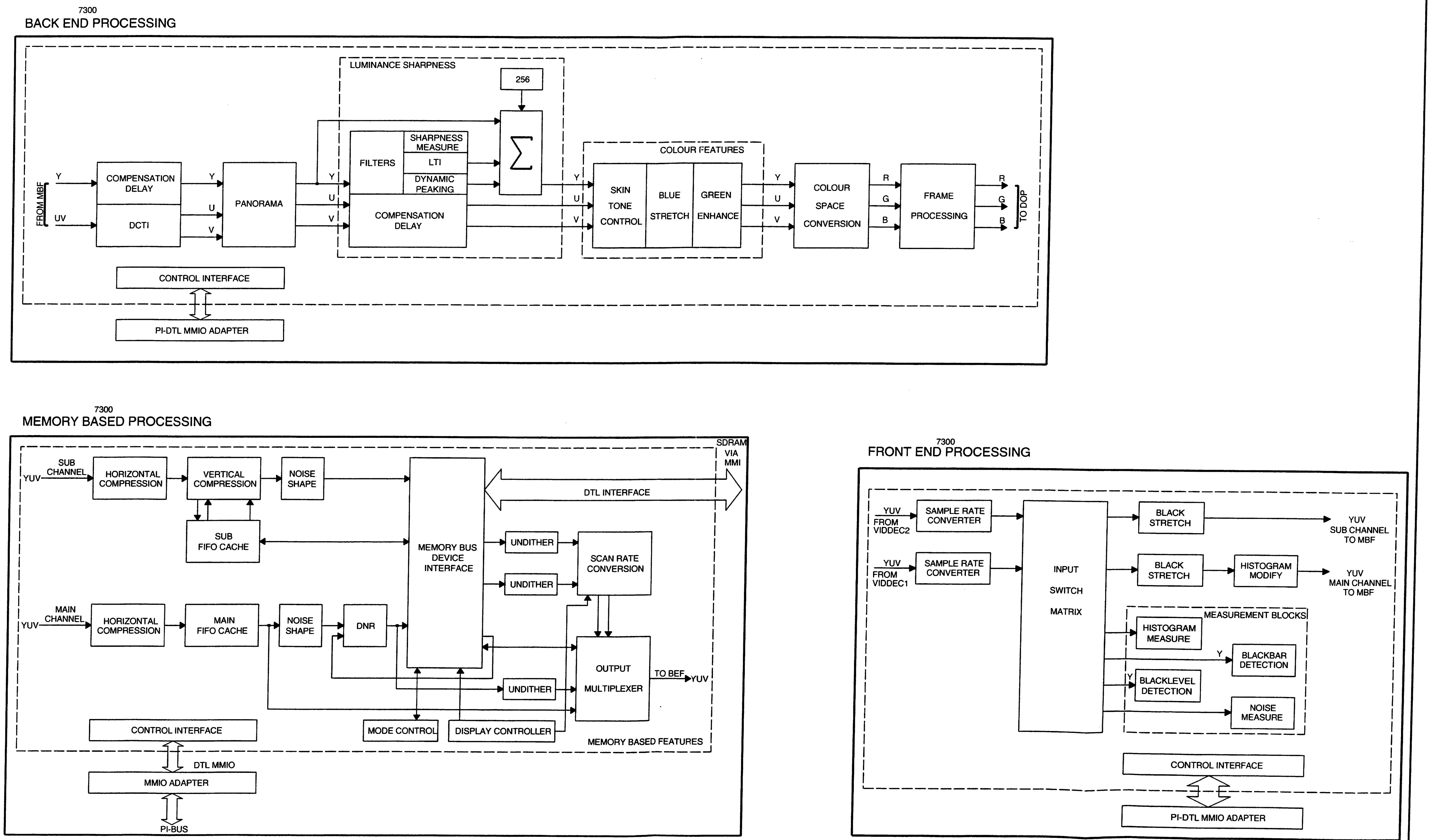
Small Signal Board: Video Decoder

2281	A9
2282	C9
2284	D9
2285	D9
3281	C1
3282	D2
3283	D2
3284	D2
5281	A9
5282	C9
5283	D9
5285	D9
7300-J	A3
F281	D9
F282	C2
I281	D2


B5 VIDEO DECODER
1 2 3 4 5 6 7 8 9
A B C D
7300-J
ADOC
B2-31 STROBE1N H23 DLINK1SN
B2-32 STROBE1P H24 DLINK1SP
B2-33 DATA1N H25 DLINK1DN
B2-34 DATA1P H26 DLINK1DP
I2D1
B2-35 STROBE3N E23 DLINK3SN
B2-36 STROBE3P E24 DLINK3SP
B2-37 DATA3N E25 DLINK3DN
B2-38 DATA3P E26 DLINK3DP
I2D3
B2-39 STROBE2N F24 DLINK2SN
B2-40 STROBE2P F25 DLINK2SP
B2-41 DATA2N G24 DLINK2DN
B2-42 DATA2P G25 DLINK2DP
I2D2
SEC DECODER
PRI DECODER
EXT MAIN STEREO CHANNEL (A-ADC1, A-ADC2)
SSIF
EXT SUB MONO-CHANNEL (A-ADC3)
A-ADC4
CVBS-YYC-DELTA +DAV
UV-DELTA +DAV
FREQ-SELECT
DELTA GEN
INCR
OVERFL
DAV
DTO
INCR
INCR
DATA SYNC
SRC
SRC-YYC
SRC-YYUV-CYC
SRC-UYUV
SRC-VYUV
AGC
AMP-SYNCYC
SYNC-GAIN
AMP-YYC
CVBS-Y-GAIN
AMP-YYUV-CYC
AMP-UYUV
UV-GAIN
AMP-VYUV
SYNC-GAIN
PRF-SYNC-2FH
SYNC-MODULE-2FH
BANDOUTS
VIDDEC-INT
REGISTER AND PI INTERF
PI-A
PI-D
DMSD
ITS
DEC
DEMUX
COMB
YC DET
FORMAT
HV-INFO
FBLANK FIFO
FBLANK SWITCH
FORMATTER
H/V SYNC
Y
UV
DELAY AND FAST-BLANK
F282
3281 1K
3282 1K
3283 1K
3284 1K
I281
P24 VSYNC1
P25 VSYNC2
EXT SYNC-MUX
N24 HSYNCFBL1
N25 HSYNCFBL2
R23 HVINFO2
P26 HVINFO1
B2-26 V-2FH
B18-45 FBL-SC1-IN
B2-25 H-2FH
B2-44 HV_SEC
B2-43 HV_PRM
TDC-ANA
TDC-DIG
HSYNC-FBL+DELTA
EXT-SYNC
HSYNC+DELTA
FBL+DELTA
'SRC' FOR HFB1/H-SYNC
DLINK-VDDA F23
DLINK-VDDD D26
DLINK-VSSA G26
DLINK-VSSD J23
VDDCO
5281 100Mhz / 220R
2281 100n
VID1-DTC-VDDA P23
VID1-DTC-VSSA N26
VID1-DTC-VDD3 N23
VDDCO
5282 100Mhz / 220R
2282 100n
VDDE
5283 100Mhz / 220R
3V2 DC
F281
2284 100n
PLLVSSA AE3
PLLVDDA AF3
VDDCO
5285 100Mhz / 220R
2285 100n
3139 123 5536.2
CL 36532058_026.eps 211103

Small Signal Board: Feature Box

B6 FEATURE BOX


7300
BACK END PROCESSING
LUMINANCE SHARPNESS
256
FROM MBF
Y
UV
COMPENSATION DELAY
DCTI
Y
U
V
PANORAMA
FILTERS
SHARPNESS MEASURE
LTI
DYNAMIC PEAKING
COMPENSATION DELAY
Σ
COLOUR FEATURES
SKIN TONE CONTROL
BLUE STRETCH
GREEN ENHANCE
COLOUR SPACE CONVERSION
R
G
B
FRAME PROCESSING
TO DOP
CONTROL INTERFACE
PI-DTL MMIO ADAPTER
7300
MEMORY BASED PROCESSING
SDRAM VIA MMI
YUV
SUB CHANNEL
HORIZONTAL COMPRESSION
VERTICAL COMPRESSION
NOISE SHAPE
SUB FIFO CACHE
MEMORY BUS DEVICE INTERFACE
DTL INTERFACE
UNDITHER
UNDITHER
SCAN RATE CONVERSION
MAIN CHANNEL
HORIZONTAL COMPRESSION
MAIN FIFO CACHE
NOISE SHAPE
DNR
OUTPUT MULTIPLEXER
UNDITHER
TO BEF
YUV
CONTROL INTERFACE
MODE CONTROL
DISPLAY CONTROLLER
MEMORY BASED FEATURES
DTL MMIO
MMIO ADAPTER
PI-BUS
7300
FRONT END PROCESSING
YUV FROM VIDDEC2
SAMPLE RATE CONVERTER
YUV FROM VIDDEC1
SAMPLE RATE CONVERTER
INPUT SWITCH MATRIX
BLACK STRETCH
YUV SUB CHANNEL TO MBF
BLACK STRETCH
HISTOGRAM MODIFY
YUV MAIN CHANNEL TO MBF
MEASUREMENT BLOCKS
HISTOGRAM MEASURE
Y
BLACKBAR DETECTION
Y
BLACKLEVEL DETECTION
NOISE MEASURE
CONTROL INTERFACE
PI-DTL MMIO ADAPTER

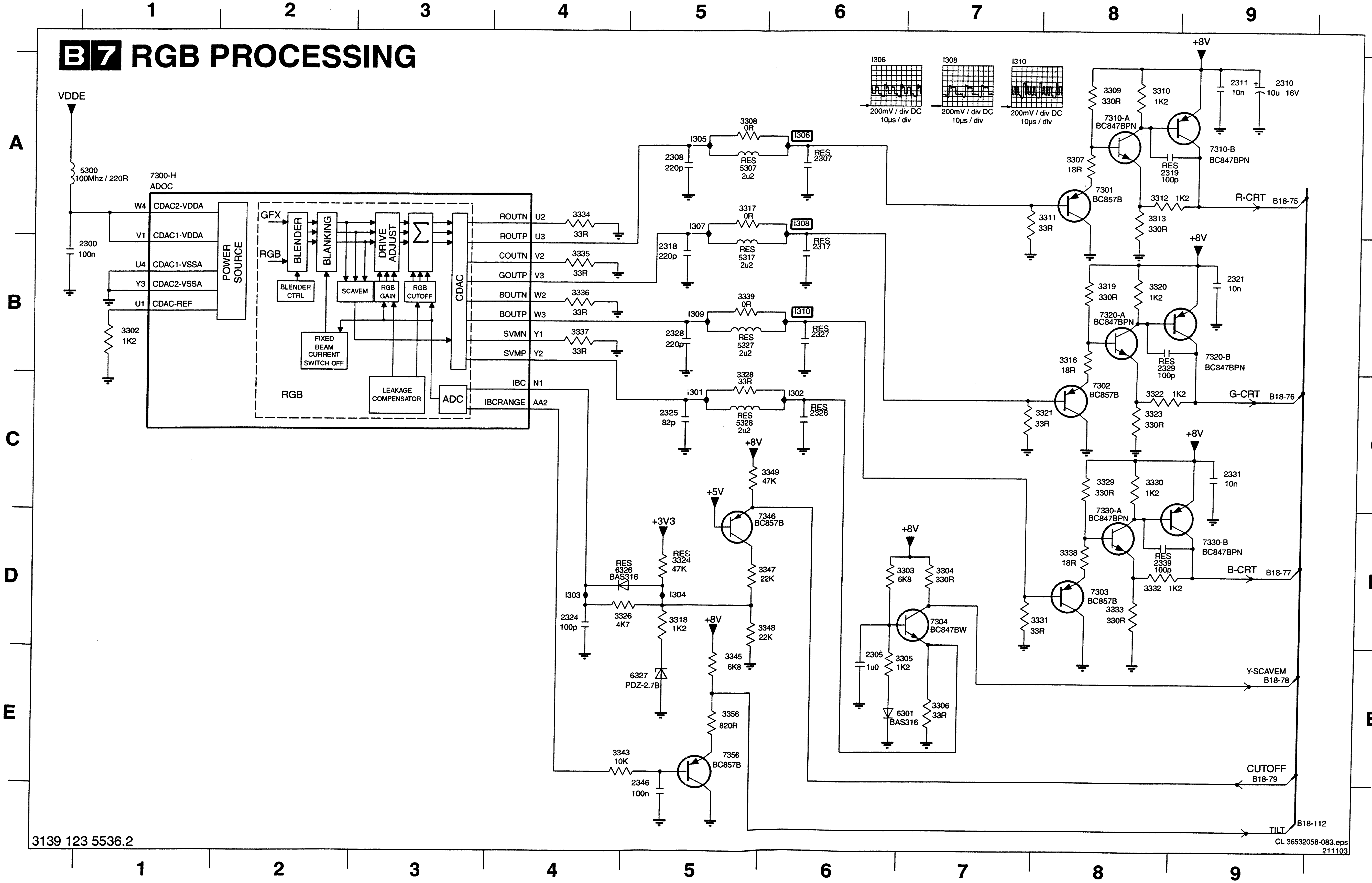
3139 123 5536.2

CL 36532058_027.eps
020903

Small Signal Board: RGB Processing

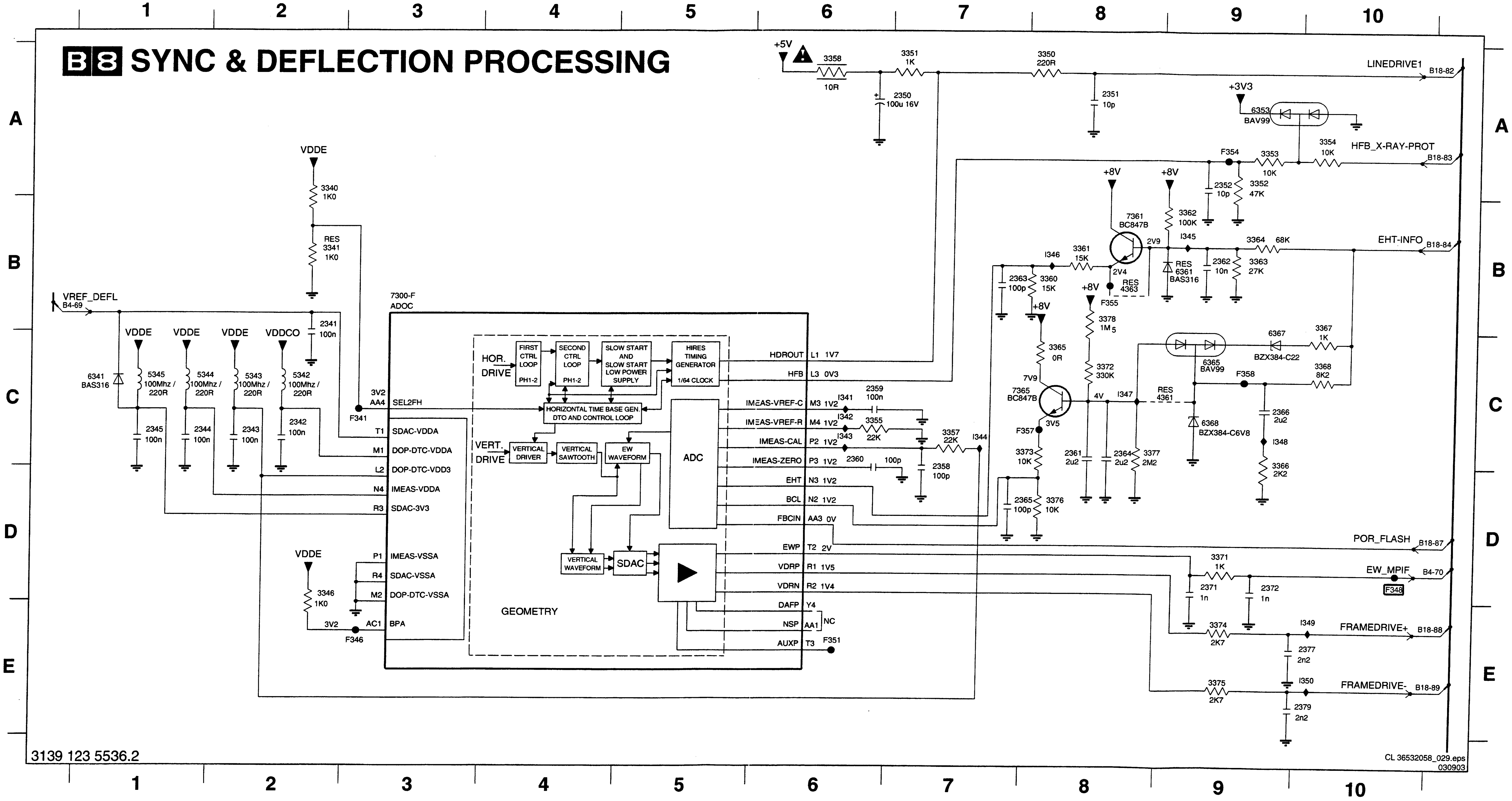
2300 B1
2305 E6
2307 A6
2308 A5
2310 A9
2311 A9
2317 B6
2318 B5
2319 A8
2321 B9
2324 D4
2325 C5
2326 C6
2327 B6
2328 B5
2329 B8
2331 C9
2339 D8
2346 E5
3302 B1
3303 D7
3304 D7
3305 E7
3306 E7
3307 A8
3308 A5
3309 A8
3310 A8
3311 A8
3312 A8
3313 A8
3316 B8
3317 A5
3318 D5
3319 B8
3320 B8
3321 C8
3322 C8
3323 C8
3324 D5
3326 D4
3328 C5
3329 C8
3330 C8
3331 D8
3332 D8
3333 D8
3334 A4
3335 B4
3336 B4
3337 B4
3338 D8
3339 B5
3343 E4
3345 E5
3347 D6
3348 D6
3349 C6
3356 E5
5300 A1
5307 A5
5317 B5
5327 B5
5328 C5
6301 E7
6326 D4
6327 E5
7300-H A1
7301 A8
7302 C8
7303 D8
7304 D7
7310-A A8
7310-B A9
7320-A B8
7320-B B9
7330-A D8
7330-B D9
7346 D5
7356 E5
I301 C5
I302 C6
I303 D4
I304 D5
I305 A5
I306 A6
I307 A5
I308 A6
I309 B5
I310 B6

B7 RGB PROCESSING


1
2
3
4
5
6
7
8
9
A
B
C
D
E
VDDE
5300
100Mhz / 220R
2300
100n
3302
1K2
7300-H
ADOC
W4 CDAC2-VDDA
V1 CDAC1-VDDA
U4 CDAC1-VSSA
Y3 CDAC2-VSSA
U1 CDAC-REF
POWER SOURCE
GFX
RGB
BLENDER
BLANKING
DRIVE ADJUST
Σ
CDAC
BLENDER CTRL
SCAVEM
RGB GAIN
RGB CUTOFF
FIXED BEAM CURRENT SWITCH OFF
LEAKAGE COMPENSATOR
ADC
RGB
ROUTN U2
ROUTP U3
COUTN V2
GOUTP V3
BOUTN W2
BOUTP W3
SVMN Y1
SVMP Y2
IBC N1
IBCRANGE AA2
3334 33R
3335 33R
3336 33R
3337 33R
1305
3308 0R
1306
2308 220p
RES 5307 2u2
RES 2307
1307
3317 0R
1308
2318 220p
RES 5317 2u2
RES 2317
1309
3339 0R
1310
2328 220p
RES 5327 2u2
RES 2327
1301
3328 33R
1302
2325 82p
RES 5328 2u2
RES 2326
1306
1308
1310
200mV / div DC 10µs / div
200mV / div DC 10µs / div
200mV / div DC 10µs / div
+8V
3309 330R
3310 1K2
2311 10n
2310 10u 16V
7310-A BC847BPN
7310-B BC847BPN
RES 2319 100p
3307 18R
7301 BC857B
3311 33R
3312 1K2
3313 330R
R-CRT B18-75
+8V
3319 330R
3320 1K2
2321 10n
7320-A BC847BPN
7320-B BC847BPN
RES 2329 100p
3316 18R
7302 BC857B
3321 33R
3322 1K2
3323 330R
G-CRT B18-76
+8V
3329 330R
3330 1K2
2331 10n
7330-A BC847BPN
7330-B BC847BPN
RES 2339 100p
3338 18R
7303 BC857B
3331 33R
3332 1K2
3333 330R
B-CRT B18-77
+8V
3349 47K
+5V
7346 BC857B
3347 22K
3348 22K
+3V3
RES 3324 47K
RES 6326 BAS316
1303
1304
2324 100p
3326 4K7
3318 1K2
+8V
3345 6K8
6327 PDZ-2.7B
3356 820R
3343 10K
2346 100n
7356 BC857B
+8V
3303 6K8
3304 330R
7304 BC847BW
2305 1u0
3305 1K2
6301 BAS316
3306 33R
Y-SCAVEM B18-78
CUTOFF B18-79
TILT B18-112
3139 123 5536.2
CL 36532058-083.eps 211103

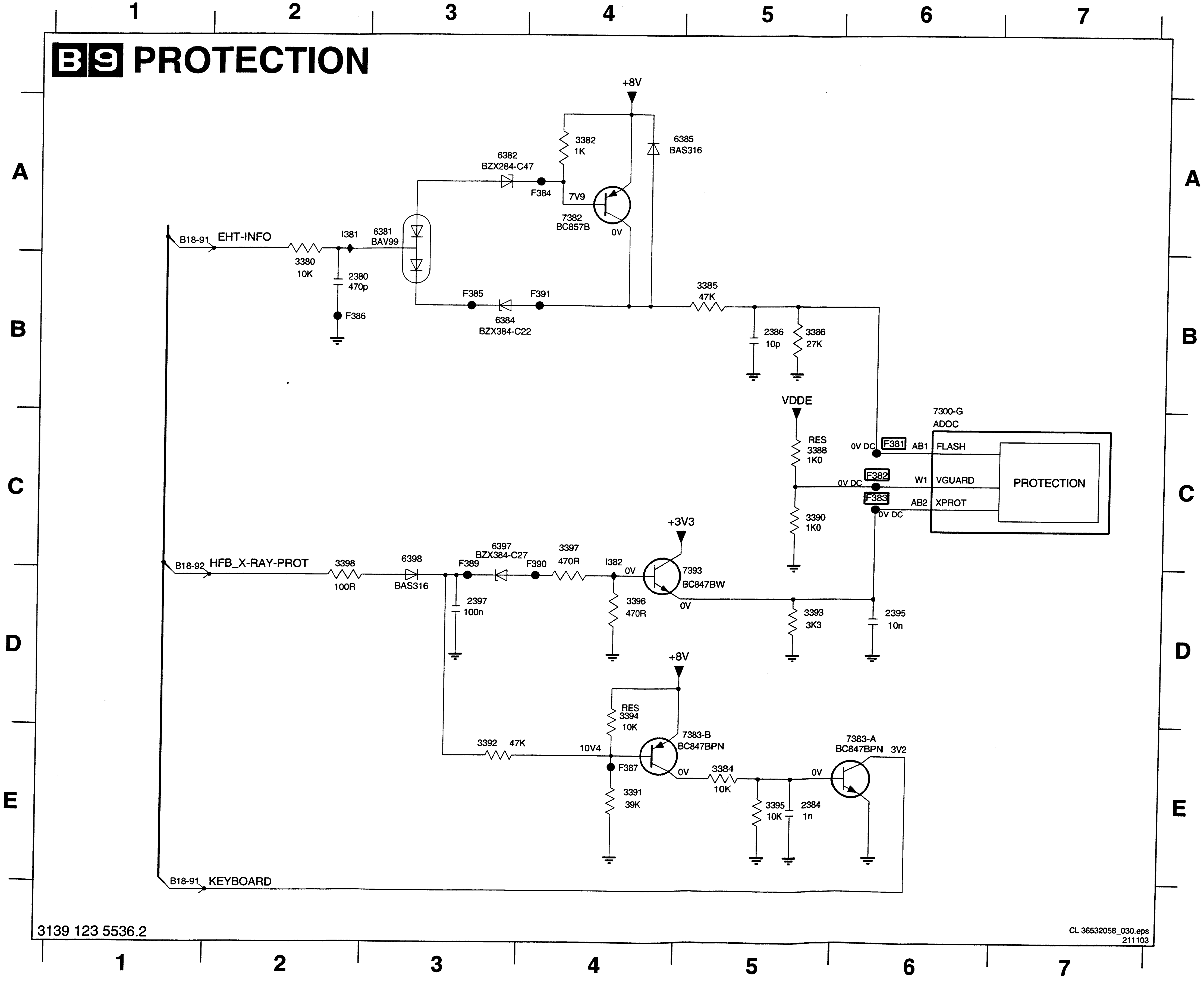
Small Signal Board: Sync & Deflection Processing

2341 B2
2342 C2
2343 C2
2344 C1
2345 C1
2350 A7
2351 A8
2352 A9
2358 D7
2359 C6
2360 C6
2361 C8
2362 B9
2363 B7
2364 C8
2365 D8
2366 C9
2371 D9
2372 D9
2377 E10
2379 E10
3340 A2
3341 B2
3346 D2
3350 A8
3351 A7
3352 A9
3353 A9
3354 A10
3355 C6
3357 C7
3358 A6
3360 B8
3361 B8
3362 B9
3363 B9
3364 B9
3365 C8
3366 C9
3367 B10
3368 C10
3371 D9
3372 C8
3373 C8
3374 E9
3375 E9
3376 D8
3377 C8
3378 B8
4361 C9
4363 B8
5342 C2
5343 C2
5344 C1
5345 C1
6341 C1
6353 A9
6361 B9
6365 C9
6367 C9
6368 C9
7300-F B3
7361 B8
7365 C8
F341 C3
F346 E3
F348 D10
F351 E6
F354 A9
F355 B8
F357 C8
F358 C9
I341 C6
I342 C6
I343 C6
I344 C7
I345 B9
I346 B8
I347 C8
I348 C9
I349 E10
I350 E10


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
B8 SYNC & DEFLECTION PROCESSING
+5V
3358
10R
3351
1K
3350
220R
2350
100u 16V
2351
10p
LINEDRIVE1
B18-82
+3V3
6353
BAV99
3354
10K
HFB_X-RAY-PROT
F354
3353
10K
B18-83
VDDE
3340
1K0
RES
3341
1K0
+8V
+8V
2352
10p
3352
47K
7361
BC847B
3362
100K
I345
3364 68K
EHT-INFO
B18-84
I346
3361
15K
2V9
2V4
RES
6361
BAS316
2362
10n
3363
27K
2363
100p
3360
15K
+8V
RES
4363
F355
VREF_DEFL
B4-69
7300-F
ADOC
2341
100n
VDDE
VDDE
VDDE
VDDCO
+8V
3378
1M5
3365
0R
6367
BZX384-C22
3367
1K
6365
BAV99
3368
8K2
F358
6341
BAS316
5345
100Mhz / 220R
5344
100Mhz / 220R
5343
100Mhz / 220R
5342
100Mhz / 220R
3V2
AA4
SEL2FH
F341
HOR.
DRIVE
FIRST CTRL LOOP
PH1-2
SECOND CTRL LOOP
PH1-2
SLOW START AND SLOW START LOW POWER SUPPLY
HIRES TIMING GENERATOR
1/64 CLOCK
HORIZONTAL TIME BASE GEN. DTO AND CONTROL LOOP
HDROUT
L1 1V7
HFB
L3 0V3
7V9
7365
BC847B
3372
330K
4V
I347
RES
4361
2366
2u2
I348
6368
BZX384-C6V8
3366
2K2
2359
100n
IMEAS-VREF-C
M3 1V2
I341
IMEAS-VREF-R
M4 1V2
I342
3355
22K
F357
3V5
2345
100n
2344
100n
2343
100n
2342
100n
T1
SDAC-VDDA
M1
DOP-DTC-VDDA
L2
DOP-DTC-VDD3
N4
IMEAS-VDDA
R3
SDAC-3V3
VERT.
DRIVE
VERTICAL DRIVER
VERTICAL SAWTOOTH
EW WAVEFORM
ADC
IMEAS-CAL
P2 1V2
I343
3357
22K
I344
IMEAS-ZERO
P3 1V2
2360
100p
2358
100p
EHT
N3 1V2
BCL
N2 1V2
FBCIN
AA3 0V
3373
10K
2361
2u2
2364
2u2
3377
2M2
2365
100p
3376
10K
POR_FLASH
B18-87
VDDE
P1
IMEAS-VSSA
R4
SDAC-VSSA
M2
DOP-DTC-VSSA
3346
1K0
3V2
AC1
BPA
F346
VERTICAL WAVEFORM
SDAC
GEOMETRY
EWP
T2 2V
VDRP
R1 1V5
VDRN
R2 1V4
DAFP
Y4
NSP
AA1
NC
AUXP
T3
F351
3371
1K
2371
1n
2372
1n
EW_MPIF
B4-70
F348
3374
2K7
I349
FRAMEDRIVE+
B18-88
2377
2n2
3375
2K7
I350
FRAMEDRIVE-
B18-89
2379
2n2
3139 123 5536.2
CL 36532058_029.eps
030903

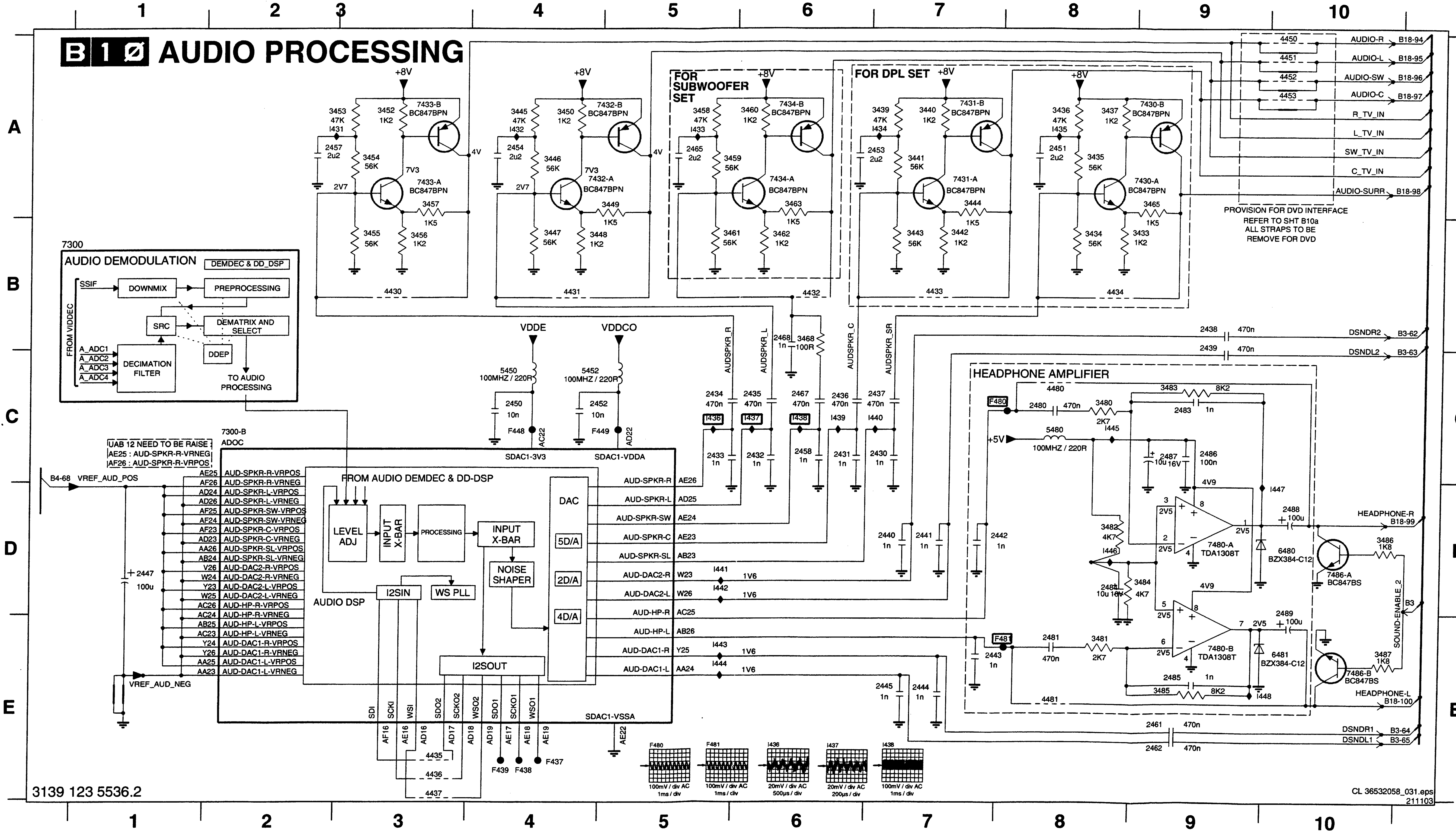
Small Signal Board: Protection

2380 B2
2386 B5
2395 E5
2395 D6
2397 D3
3380 B2
3382 A4
3384 E5
3385 B5
3386 B5
3388 C5
3390 C5
3391 E4
3392 E3
3393 D5
3394 D4
3395 E5
3396 D4
3397 C4
3398 C2
6381 A3
6382 A3
6384 B3
6385 A4
6397 C3
6398 C3
7300-G C6
7382 A4
7383-A E6
7383-B E5
7393 D5
F381 C6
F382 C6
F383 C6
F384 A4
F385 B3
F386 B2
F387 E4
F389 C3
F390 C4
F391 B4
I381 A2
I382 C4


1
2
3
4
5
6
7
A
B
C
D
E
B9 PROTECTION
+8V
3382
1K
6385
BAS316
6382
BZX284-C47
F384
7V9
7382
BC857B
0V
B18-91
EHT-INFO
I381
6381
BAV99
3380
10K
2380
470p
F386
F385
F391
6384
BZX384-C22
3385
47K
2386
10p
3386
27K
VDDE
RES
3388
1K0
3390
1K0
7300-G
ADOC
0V DC
F381
AB1
FLASH
F382
W1
VGUARD
F383
AB2
XPROT
PROTECTION
+3V3
B18-92
HFB_X-RAY-PROT
3398
100R
6398
BAS316
6397
BZX384-C27
F389
F390
3397
470R
I382
7393
BC847BW
2397
100n
3396
470R
3393
3K3
2395
10n
RES
3394
10K
7383-B
BC847BPN
3392
47K
10V4
F387
3384
10K
7383-A
BC847BPN
3V2
3391
39K
3395
10K
2384
1n
B18-91
KEYBOARD
3139 123 5536.2
CL 36532058_030.eps
211103

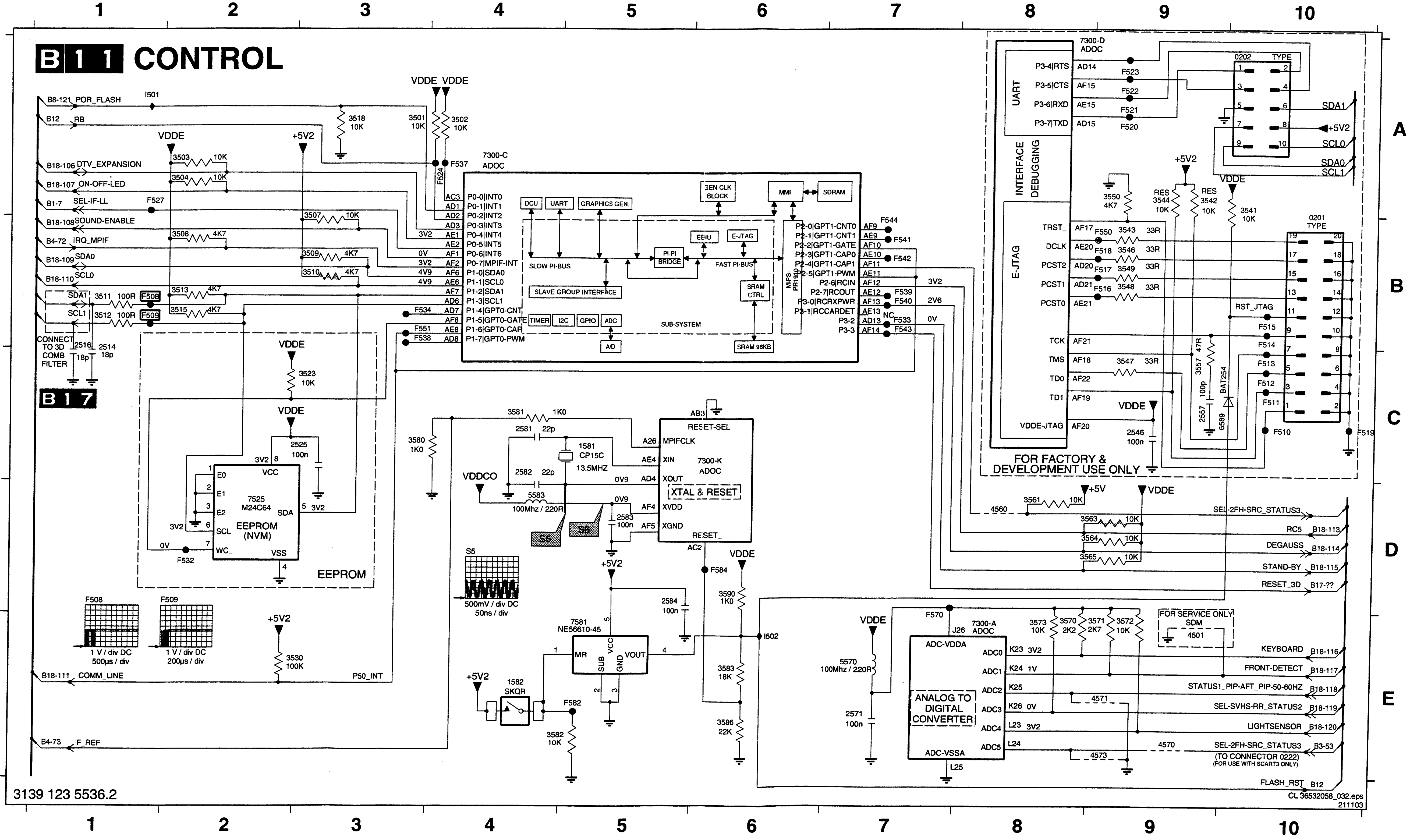
Small Signal Board: Audio Processing

2430 C7	2437 C7	2444 E7	2454 A4	2468 B6	2487 C9	3437 A8	3445 A4	3453 A2	3460 A6	3481 E8	4430 B3	4437 E3	5450 C4	7430-B A9	7434-A A6	F438 E4	I432 A4	I439 C6	I446 D8
2431 C6	2438 B9	2445 E7	2457 A2	2480 C8	2488 D10	3439 A7	3446 A4	3454 A3	3461 B5	3482 D8	4431 B4	4450 A10	5452 C4	7431-A A7	7434-B A6	F439 E4	I433 A5	I440 C7	I447 D10
2432 C6	2439 B9	2447 D1	2458 C6	2481 E8	2489 D10	3440 A7	3447 B4	3455 B3	3462 B6	3483 C9	4432 B6	4451 A10	5480 C8	7431-B A7	7480-A D9	F448 C4	I434 A7	I441 D5	I448 E10
2433 C5	2440 D7	2450 C4	2461 E9	2483 C9	3433 B9	3441 A7	3448 B4	3456 B3	3463 A6	3484 D9	4433 B7	4452 A10	6480 D10	7432-A A4	7480-B E9	F449 C4	I435 A8	I442 D5	
2434 C5	2441 D7	2451 A8	2462 E9	2484 D8	3434 B8	3442 B7	3449 A5	3457 A3	3465 A9	3485 E9	4434 B8	4453 A10	6481 E10	7432-B A4	7486-A D10	F480 C7	I436 C5	I443 E5	
2435 C6	2442 D8	2452 C4	2465 A5	2485 E9	3435 A8	3443 B7	3450 A4	3458 A5	3468 B6	3486 D10	4435 E3	4480 C8	7300-B C2	7433-A A3	7486-B E10	F481 E8	I437 C6	I444 E5	
2436 C6	2443 E7	2453 A7	2467 C6	2486 C9	3436 A8	3444 A7	3452 A3	3459 A5	3480 C8	3487 E10	4436 E3	4481 E8	7430-A A8	7433-B A3	F437 E4	I431 A2	I438 C6	I445 C8	

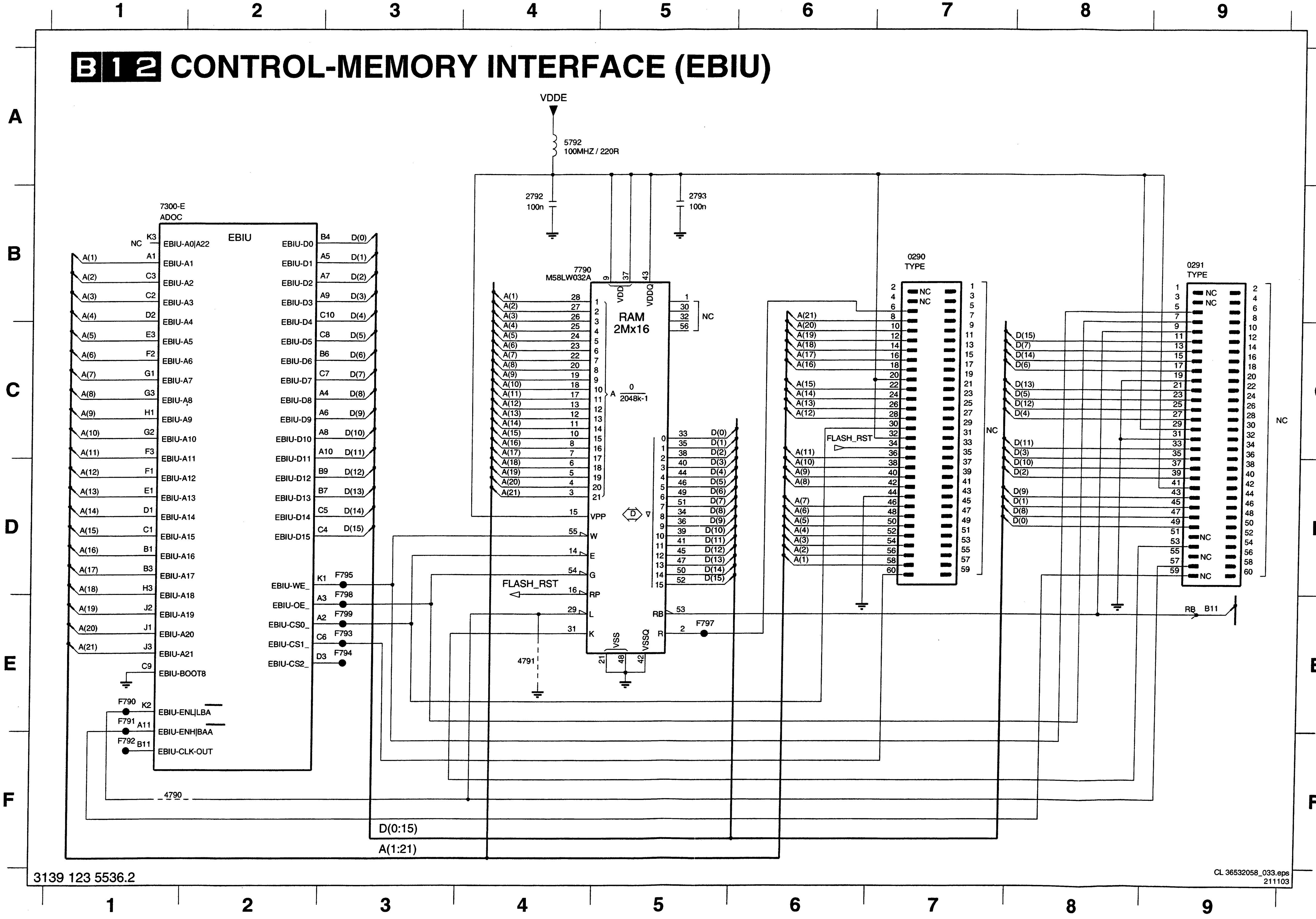

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
B10 AUDIO PROCESSING
+8V
7433-B BC847BPN
7433-A BC847BPN
7432-B BC847BPN
7432-A BC847BPN
7434-B BC847BPN
7434-A BC847BPN
7431-B BC847BPN
7431-A BC847BPN
7430-B BC847BPN
7430-A BC847BPN
FOR SUBWOOFER SET
FOR DPL SET
4V
7V3
2V7
4430
4431
4432
4433
4434
4450
4451
4452
4453
AUDIO-R B18-94
AUDIO-L B18-95
AUDIO-SW B18-96
AUDIO-C B18-97
R_TV_IN
L_TV_IN
SW_TV_IN
C_TV_IN
AUDIO-SURR B18-98
PROVISION FOR DVD INTERFACE
REFER TO SHT B10a
ALL STRAPS TO BE
REMOVE FOR DVD
7300
AUDIO DEMODULATION
DEMDEC & DD_DSP
SSIF
DOWNMIX
PREPROCESSING
SRC
DEMATRIX AND SELECT
FROM VIDDEC
A_ADC1
A_ADC2
A_ADC3
A_ADC4
DECIMATION FILTER
DDEP
TO AUDIO PROCESSING
VDDE
VDDCO
5450 100MHZ / 220R
5452 100MHZ / 220R
2450 10n
2452 10n
F448
F449
AC22
AD22
AUDSPKR_R
AUDSPKR_L
AUDSPKR_C
AUDSPKR_SR
2468 1n
3468 100R
2438 470n DSNDR2 B3-62
2439 470n DSNDL2 B3-63
HEADPHONE AMPLIFIER
UAB 12 NEED TO BE RAISE
AE25 : AUD-SPKR-R-VRNEG
AF26 : AUD-SPKR-R-VRPOS
7300-B ADOC
SDAC1-3V3
SDAC1-VDDA
B4-68 VREF_AUD_POS
AUD-SPKR-R-VRPOS
AUD-SPKR-R-VRNEG
AUD-SPKR-L-VRPOS
AUD-SPKR-L-VRNEG
AUD-SPKR-SW-VRPOS
AUD-SPKR-SW-VRNEG
AUD-SPKR-C-VRPOS
AUD-SPKR-C-VRNEG
AUD-SPKR-SL-VRPOS
AUD-SPKR-SL-VRNEG
AUD-DAC2-R-VRPOS
AUD-DAC2-R-VRNEG
AUD-DAC2-L-VRPOS
AUD-DAC2-L-VRNEG
AUD-HP-R-VRPOS
AUD-HP-R-VRNEG
AUD-HP-L-VRPOS
AUD-HP-L-VRNEG
AUD-DAC1-R-VRPOS
AUD-DAC1-R-VRNEG
AUD-DAC1-L-VRPOS
AUD-DAC1-L-VRNEG
FROM AUDIO DEMDEC & DD-DSP
LEVEL ADJ
INPUT X-BAR
PROCESSING
INPUT X-BAR
NOISE SHAPER
DAC
5D/A
2D/A
4D/A
I2SIN
WS PLL
I2SOUT
AUDIO DSP
AUD-SPKR-R AE26
AUD-SPKR-L AD25
AUD-SPKR-SW AE24
AUD-SPKR-C AE23
AUD-SPKR-SL AB23
AUD-DAC2-R W23
AUD-DAC2-L W26
AUD-HP-R AC25
AUD-HP-L AB26
AUD-DAC1-R Y25
AUD-DAC1-L AA24
1V6
2447 100u
VREF_AUD_NEG
SDI SCKI WSI SDO2 SCKO2 WSO2 SDO1 SCKO1 WSO1
AF16 AE16 AD16 AD17 AD18 AD19 AE17 AE18 AE19
SDAC1-VSSA
AE22
4435
4436
4437
F439 F438 F437
+5V
5480 100MHZ / 220R
7480-A TDA1308T
7480-B TDA1308T
4V9
2V5
6480 BZX384-C12
6481 BZX384-C12
7486-A BC847BS
7486-B BC847BS
HEADPHONE-R B18-99
HEADPHONE-L B18-100
SOUND-ENABLE_2 B3
DSNDR1 B3-64
DSNDL1 B3-65
F480 100mV / div AC 1ms / div
F481 100mV / div AC 1ms / div
I436 20mV / div AC 500µs / div
I437 20mV / div AC 200µs / div
I438 100mV / div AC 1ms / div
3139 123 5536.2
CL 36532058_031.eps 211103

Small Signal Board: Control

0201	A10
0202	A10
1581	C5
1582	E4
2514	B1
2516	C1
2525	C3
2546	C9
2557	C9
2571	E7
2581	C4
2582	C4
2583	D5
2584	D5
3501	A3
3502	A4
3503	A2
3504	A2
3507	B3
3508	B2
3509	B3
3510	B3
3511	B1
3512	B1
3513	B2
3515	B2
3518	A3
3523	C3
3530	E3
3541	A10
3542	A9
3543	B9
3544	A9
3546	B9
3547	C9
3548	B9
3549	B9
3550	A9
3557	C9
3561	D8
3563	D8
3564	D9
3565	D8
3570	E8
3571	E9
3572	E9
3573	E8
3580	C3
3581	C4
3582	E4
3583	E6
3586	E6
3590	D6
4501	E9
4560	D8
4570	E9
4571	E9
4573	E9
5570	E7
5583	D4
6589	C10
7300-A	E8
7300-C	A4
7300-D	A8
7300-K	C6
7525	D2
7581	E5
F508	B1
F509	B1
F510	C10
F511	C10
F512	C10
F513	C10
F514	B10
F515	B10
F516	B9
F517	B9
F518	B9
F519	C10
F520	A9
F521	A9
F522	A9
F523	A9
F524	A4
F527	A1
F532	D2
F533	B7
F534	B3
F537	A4
F538	B3
F539	B7
F540	B7
F541	B7
F542	B7
F543	B7
F544	B7
F550	B9
F551	B3
F570	E7
F582	E5
F584	D6
I501	A1
I502	E6


B11 CONTROL
B17
1 2 3 4 5 6 7 8 9 10
A B C D E
B8-121 POR_FLASH
B12 RB
B18-106 DTV_EXPANSION
B18-107 ON-OFF-LED
B1-7 SEL-IF-LL
B18-108 SOUND-ENABLE
B4-72 IRQ_MPIF
B18-109 SDA0
B18-110 SCL0
SDA1
SCL1
CONNECT TO 3D COMB FILTER
VDDE
+5V2
7300-C ADOC
P0-0|INT0
P0-1|INT1
P0-2|INT2
P0-3|INT3
P0-4|INT4
P0-5|INT5
P0-6|INT6
P0-7|MPIF-INT
P1-0|SDA0
P1-1|SCL0
P1-2|SDA1
P1-3|SCL1
P1-4|GPT0-CNT
P1-5|GPT0-GATE
P1-6|GPT0-CAP
P1-7|GPT0-PWM
DCU
UART
GRAPHICS GEN.
GEN CLK BLOCK
MMI
SDRAM
EBIU
E-JTAG
PI-PI BRIDGE
SLOW PI-BUS
FAST PI-BUS
SLAVE GROUP INTERFACE
SRAM CTRL
TIMER
I2C
GPIO
ADC
A/D
SUB-SYSTEM
SRAM 96KB
MIPS-PR1910
P2-0|GPT1-CNT0
P2-1|GPT1-CNT1
P2-2|GPT1-GATE
P2-3|GPT1-CAP0
P2-4|GPT1-CAP1
P2-5|GPT1-PWM
P2-6|RCIN
P2-7|RCOUT
P3-0|RCRXPWR
P3-1|RCCARDET
P3-2
P3-3
7300-D ADOC
UART
P3-4|RTS
P3-5|CTS
P3-6|RXD
P3-7|TXD
INTERFACE DEBUGGING
E-JTAG
TRST_
DCLK
PCST2
PCST1
PCST0
TCK
TMS
TDO
TDI
VDDE-JTAG
0202 TYPE
0201 TYPE
SDA1
SCL0
SDA0
SCL1
RST_JTAG
FOR FACTORY & DEVELOPMENT USE ONLY
7525 M24C64
EEPROM (NVM)
E0
E1
E2
SCL
WC_
VCC
SDA
VSS
EEPROM
7300-K ADOC
RESET-SEL
MPIFCLK
XIN
XOUT
XVDD
XGND
RESET_
XTAL & RESET
1581 CP15C 13.5MHZ
VDDCO
5583 100Mhz / 220R
S5
S6
500mV / div DC 50ns / div
F508
F509
1 V / div DC 500μs / div
1 V / div DC 200μs / div
7581 NE56610-45
MR
SUB
VCC
GND
VOUT
1582 SKQR
B18-111 COMM_LINE
P50_INT
B4-73 F_REF
SEL-2FH-SRC_STATUS3
RC5 B18-113
DEGAUSS B18-114
STAND-BY B18-115
RESET_3D B17-??
7300-A ADOC
ADC-VDDA
ANALOG TO DIGITAL CONVERTER
ADC-VSSA
ADC0
ADC1
ADC2
ADC3
ADC4
ADC5
FOR SERVICE ONLY SDM
KEYBOARD B18-116
FRONT-DETECT B18-117
STATUS1_PIP-AFT_PIP-50-60HZ B18-118
SEL-SVHS-RR_STATUS2 B18-119
LIGHTSENSOR B18-120
SEL-2FH-SRC_STATUS3 B3-53
(TO CONNECTOR 0222) (FOR USE WITH SCART3 ONLY)
FLASH_RST B12
5570 100Mhz / 220R
3139 123 5536.2
CL 36532058_032.eps 211103

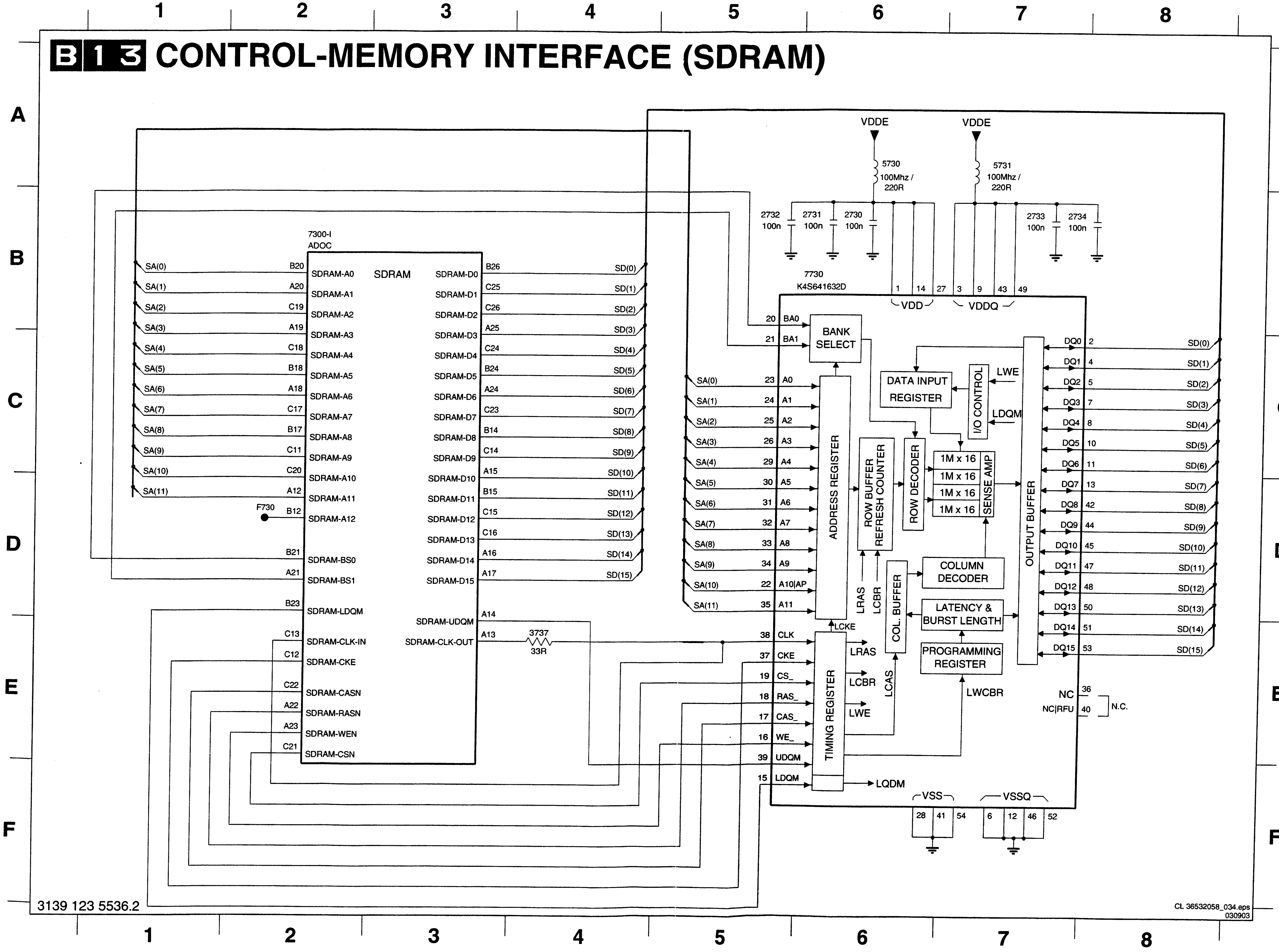
Small Signal Board: Control-Memory Interface (EBIU)


B12 CONTROL-MEMORY INTERFACE (EBIU)
VDDE
5792
100MHZ / 220R
2792
100n
2793
100n
7300-E
ADOC
EBIU
EBIU-A0|A22
EBIU-A1 … EBIU-A21
EBIU-BOOT8
EBIU-ENL|LBA
EBIU-ENH|BAA
EBIU-CLK-OUT
EBIU-D0 … EBIU-D15
EBIU-WE_
EBIU-OE_
EBIU-CS0_
EBIU-CS1_
EBIU-CS2_
F790
F791
F792
F793
F794
F795
F797
F798
F799
7790
M58LW032A
RAM
2Mx16
VDD
VDDQ
VSS
VSSQ
VPP
W
E
G
RP
L
K
RB
R
0
2048k-1
FLASH_RST
4790
4791
0290
TYPE
0291
TYPE
NC
RB B11
D(0:15)
A(1:21)
3139 123 5536.2
CL 36532058_033.eps
211103

0290	B7
0291	B9
2792	B4
2793	B6
4790	F1
4791	E4
5792	A4
7300-E	B1
7790	B4
F790	E1
F791	E1
F792	F1
F793	E3
F794	E3
F795	D3
F797	E5
F798	E3
F799	E3

Small Signal Board: Control-Memory Interface (SDRAM)

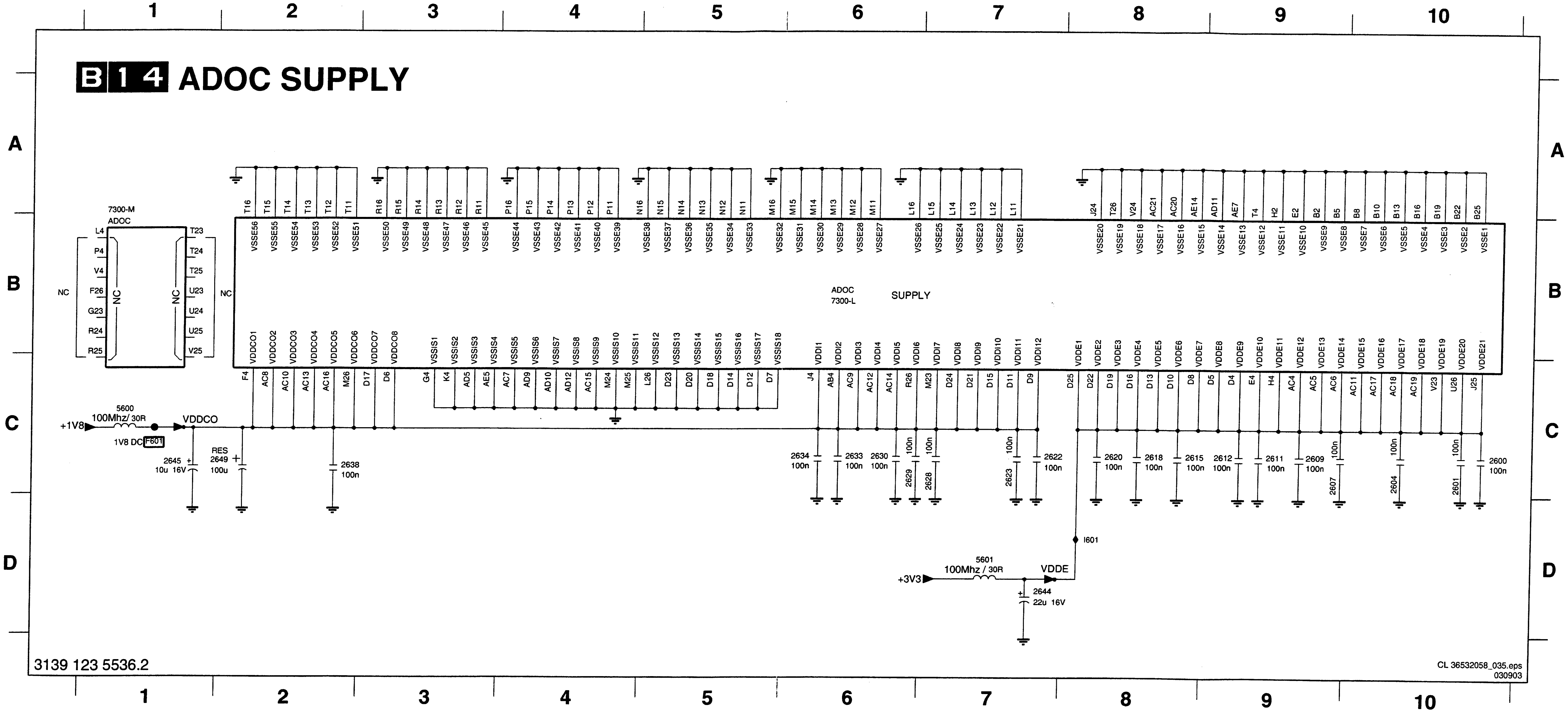
B13 CONTROL-MEMORY INTERFACE (SDRAM)


1
2
3
4
5
6
7
8
A
B
C
D
E
F
7300-I
ADOC
SDRAM
SA(0) B20 SDRAM-A0
SA(1) A20 SDRAM-A1
SA(2) C19 SDRAM-A2
SA(3) A19 SDRAM-A3
SA(4) C18 SDRAM-A4
SA(5) B18 SDRAM-A5
SA(6) A18 SDRAM-A6
SA(7) C17 SDRAM-A7
SA(8) B17 SDRAM-A8
SA(9) C11 SDRAM-A9
SA(10) C20 SDRAM-A10
SA(11) A12 SDRAM-A11
F730 B12 SDRAM-A12
B21 SDRAM-BS0
A21 SDRAM-BS1
B23 SDRAM-LDQM
C13 SDRAM-CLK-IN
C12 SDRAM-CKE
C22 SDRAM-CASN
A22 SDRAM-RASN
A23 SDRAM-WEN
C21 SDRAM-CSN
SDRAM-D0 B26 SD(0)
SDRAM-D1 C25 SD(1)
SDRAM-D2 C26 SD(2)
SDRAM-D3 A25 SD(3)
SDRAM-D4 C24 SD(4)
SDRAM-D5 B24 SD(5)
SDRAM-D6 A24 SD(6)
SDRAM-D7 C23 SD(7)
SDRAM-D8 B14 SD(8)
SDRAM-D9 C14 SD(9)
SDRAM-D10 A15 SD(10)
SDRAM-D11 B15 SD(11)
SDRAM-D12 C15 SD(12)
SDRAM-D13 C16 SD(13)
SDRAM-D14 A16 SD(14)
SDRAM-D15 A17 SD(15)
SDRAM-UDQM A14
SDRAM-CLK-OUT A13
3737
33R
VDDE
VDDE
5730
100Mhz /
220R
5731
100Mhz /
220R
2732
100n
2731
100n
2730
100n
2733
100n
2734
100n
7730
K4S641632D
1 14 27 3 9 43 49
VDD
VDDQ
20 BA0
21 BA1
BANK SELECT
SA(0) 23 A0
SA(1) 24 A1
SA(2) 25 A2
SA(3) 26 A3
SA(4) 29 A4
SA(5) 30 A5
SA(6) 31 A6
SA(7) 32 A7
SA(8) 33 A8
SA(9) 34 A9
SA(10) 22 A10|AP
SA(11) 35 A11
38 CLK
37 CKE
19 CS_
18 RAS_
17 CAS_
16 WE_
39 UDQM
15 LDQM
ADDRESS REGISTER
ROW BUFFER
REFRESH COUNTER
ROW DECODER
DATA INPUT REGISTER
I/O CONTROL
LWE
LDQM
1M x 16
1M x 16
1M x 16
1M x 16
SENSE AMP
OUTPUT BUFFER
COL. BUFFER
COLUMN DECODER
LATENCY & BURST LENGTH
PROGRAMMING REGISTER
TIMING REGISTER
LCKE
LRAS
LCBR
LWE
LCAS
LRAS
LCBR
LWCBR
LQDM
DQ0 2 SD(0)
DQ1 4 SD(1)
DQ2 5 SD(2)
DQ3 7 SD(3)
DQ4 8 SD(4)
DQ5 10 SD(5)
DQ6 11 SD(6)
DQ7 13 SD(7)
DQ8 42 SD(8)
DQ9 44 SD(9)
DQ10 45 SD(10)
DQ11 47 SD(11)
DQ12 48 SD(12)
DQ13 50 SD(13)
DQ14 51 SD(14)
DQ15 53 SD(15)
NC 36
NC|RFU 40
N.C.
VSS
VSSQ
28 41 54
6 12 46 52
3139 123 5536.2
CL 36532058_034.eps
030903

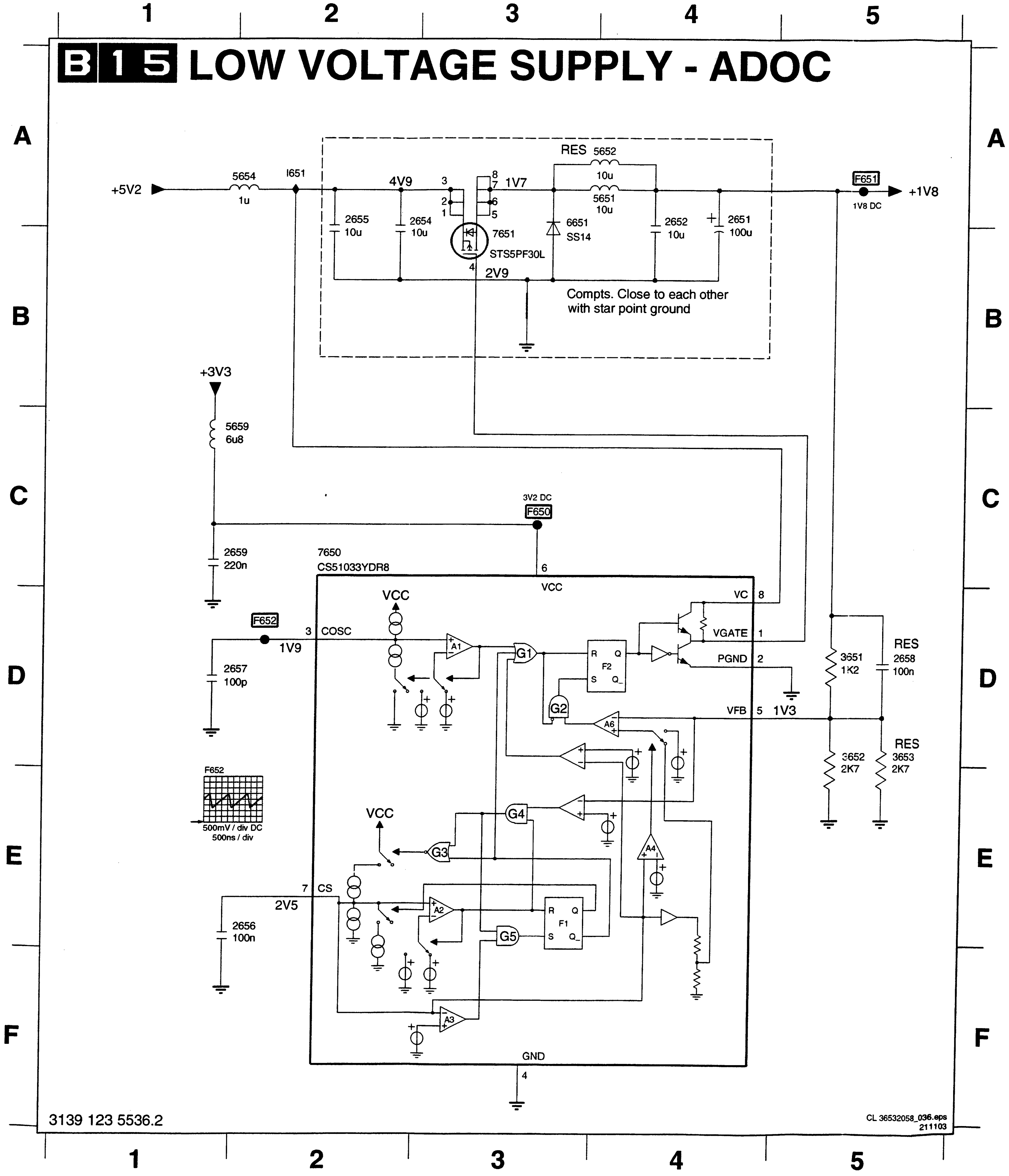
2730	B6
2731	B6
2732	B5
2733	B7
2734	B7
3737	E4
5730	A6
5731	A7
7300-I	B2
7730	B6
F730	D2

Small Signal Board: ADOC Supply

2600	C10
2601	C10
2604	C10
2607	C9
2609	C9
2611	C9
2612	C9
2615	C8
2618	C8
2620	C8
2622	C7
2623	C7
2628	C7
2629	C6
2630	C6
2633	C6
2634	C6
2638	C2
2644	D7
2645	C1
2649	C2
5600	C1
5601	D7
7300-L	B6
7300-M	A1
F601	C1
I601	D8


B14 ADOC SUPPLY
1 2 3 4 5 6 7 8 9 10
A B C D
7300-M
ADOC
L4 P4 V4 F26 G23 R24 R25
T23 T24 T25 U23 U24 U25 V25
NC
NC
NC
NC
ADOC
7300-L
SUPPLY
T16 T15 T14 T13 T12 T11 R16 R15 R14 R13 R12 R11 P16 P15 P14 P13 P12 P11 N16 N15 N14 N13 N12 N11 M16 M15 M14 M13 M12 M11 L16 L15 L14 L13 L12 L11
J24 T26 V24 AC21 AC20 AE14 AD11 AE7 T4 H2 E2 B2 B5 B8 B10 B13 B16 B19 B22 B25
VSSE56 VSSE55 VSSE54 VSSE53 VSSE52 VSSE51 VSSE50 VSSE49 VSSE48 VSSE47 VSSE46 VSSE45 VSSE44 VSSE43 VSSE42 VSSE41 VSSE40 VSSE39 VSSE38 VSSE37 VSSE36 VSSE35 VSSE34 VSSE33 VSSE32 VSSE31 VSSE30 VSSE29 VSSE28 VSSE27 VSSE26 VSSE25 VSSE24 VSSE23 VSSE22 VSSE21
VSSE20 VSSE19 VSSE18 VSSE17 VSSE16 VSSE15 VSSE14 VSSE13 VSSE12 VSSE11 VSSE10 VSSE9 VSSE8 VSSE7 VSSE6 VSSE5 VSSE4 VSSE3 VSSE2 VSSE1
VDDCO1 VDDCO2 VDDCO3 VDDCO4 VDDCO5 VDDCO6 VDDCO7 VDDCO8
VSSIS1 VSSIS2 VSSIS3 VSSIS4 VSSIS5 VSSIS6 VSSIS7 VSSIS8 VSSIS9 VSSIS10 VSSIS11 VSSIS12 VSSIS13 VSSIS14 VSSIS15 VSSIS16 VSSIS17 VSSIS18
VDDI1 VDDI2 VDDI3 VDDI4 VDDI5 VDDI6 VDDI7 VDDI8 VDDI9 VDDI10 VDDI11 VDDI12
VDDE1 VDDE2 VDDE3 VDDE4 VDDE5 VDDE6 VDDE7 VDDE8 VDDE9 VDDE10 VDDE11 VDDE12 VDDE13 VDDE14 VDDE15 VDDE16 VDDE17 VDDE18 VDDE19 VDDE20 VDDE21
F4 AC8 AC10 AC13 AC16 M26 D17 D6
G4 K4 AD5 AE5 AC7 AD9 AD10 AD12 AC15 M24 M25 L26 D23 D20 D18 D14 D12 D7
J4 AB4 AC9 AC12 AC14 R26 M23 D24 D21 D15 D11 D9
D25 D22 D19 D16 D13 D10 D8 D5 D4 E4 H4 AC4 AC5 AC6 AC11 AC17 AC18 AC19 V23 U26 J25
5600
100Mhz/ 30R
+1V8
1V8 DC F601
VDDCO
2645 10u 16V
RES 2649 100u
2638 100n
2634 100n
2633 100n
2630 100n
2629 100n
2628 100n
2623 100n
2622 100n
2620 100n
2618 100n
2615 100n
2612 100n
2611 100n
2609 100n
2607 100n
2604 100n
2601 100n
2600 100n
I601
5601
100Mhz / 30R
+3V3
VDDE
2644 22u 16V
3139 123 5536.2
CL 36532058_035.eps
030903

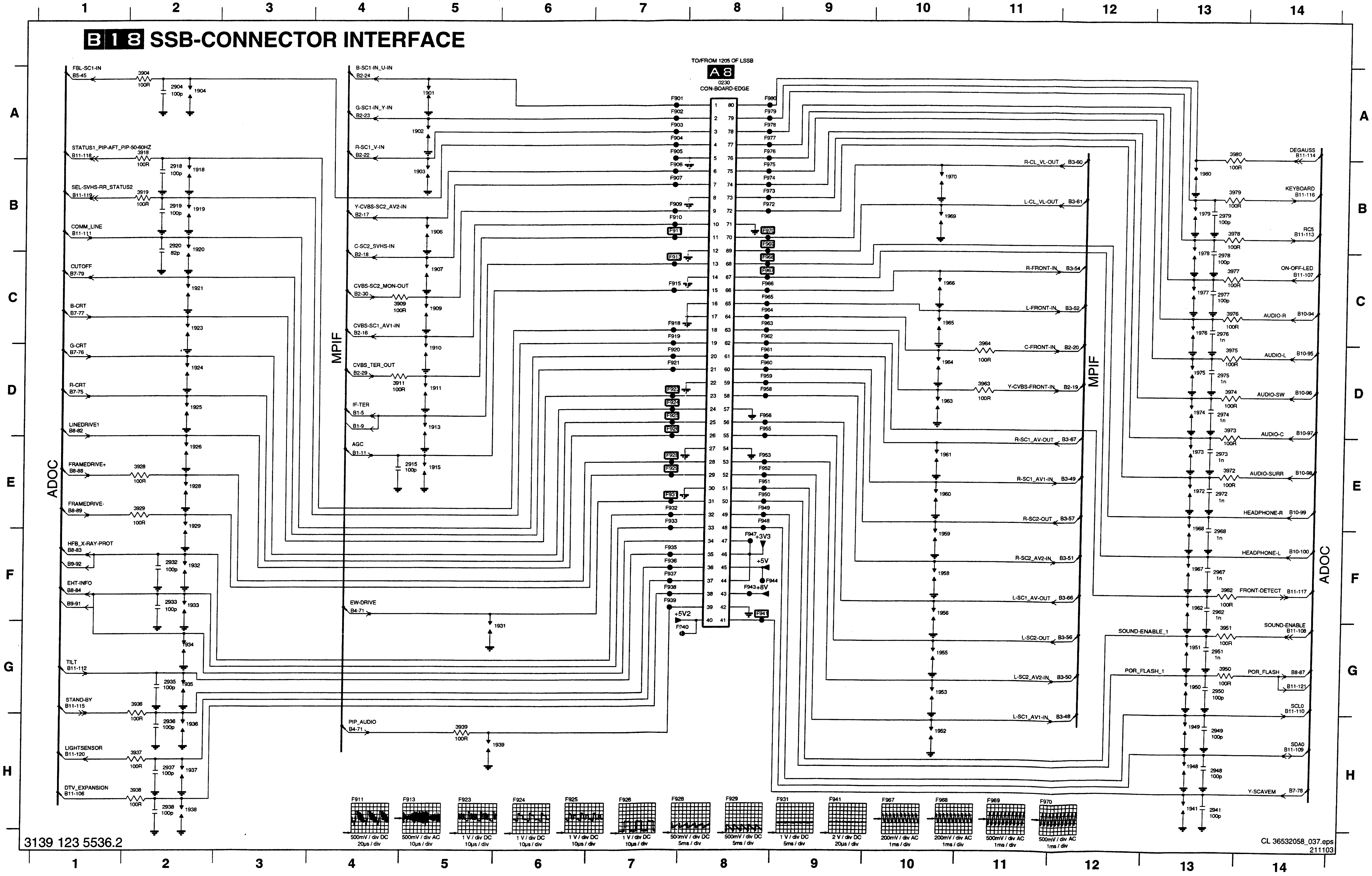
Small Signal Board: Low Voltage Supply ADOC


B15 LOW VOLTAGE SUPPLY - ADOC
1
2
3
4
5
A
B
C
D
E
F
+5V2
5654
1u
I651
4V9
1V7
RES 5652
10u
5651
10u
2655
10u
2654
10u
7651
STS5PF30L
2V9
6651
SS14
2652
10u
2651
100u
F651
1V8 DC
+1V8
Compts. Close to each other
with star point ground
+3V3
5659
6u8
3V2 DC
F650
2659
220n
7650
CS51033YDR8
VCC
VC
VGATE
PGND
VFB
1V3
COSC
F652
1V9
2657
100p
CS
2V5
2656
100n
GND
A1
A2
A3
A4
A6
G1
G2
G3
G4
G5
F1
F2
RES
2658
100n
3651
1K2
3652
2K7
RES
3653
2K7
F652
500mV / div DC
500ns / div
3139 123 5536.2
CL 36532058_036.eps
211103

2651	A4
2652	A4
2654	A2
2655	A2
2656	E2
2657	D2
2658	D5
2659	C2
3651	D5
3652	D5
3653	D5
5651	A4
5652	A4
5654	A2
5659	C2
6651	A3
7650	C2
7651	B3
F650	C3
F651	A5
F652	D2
I651	A2

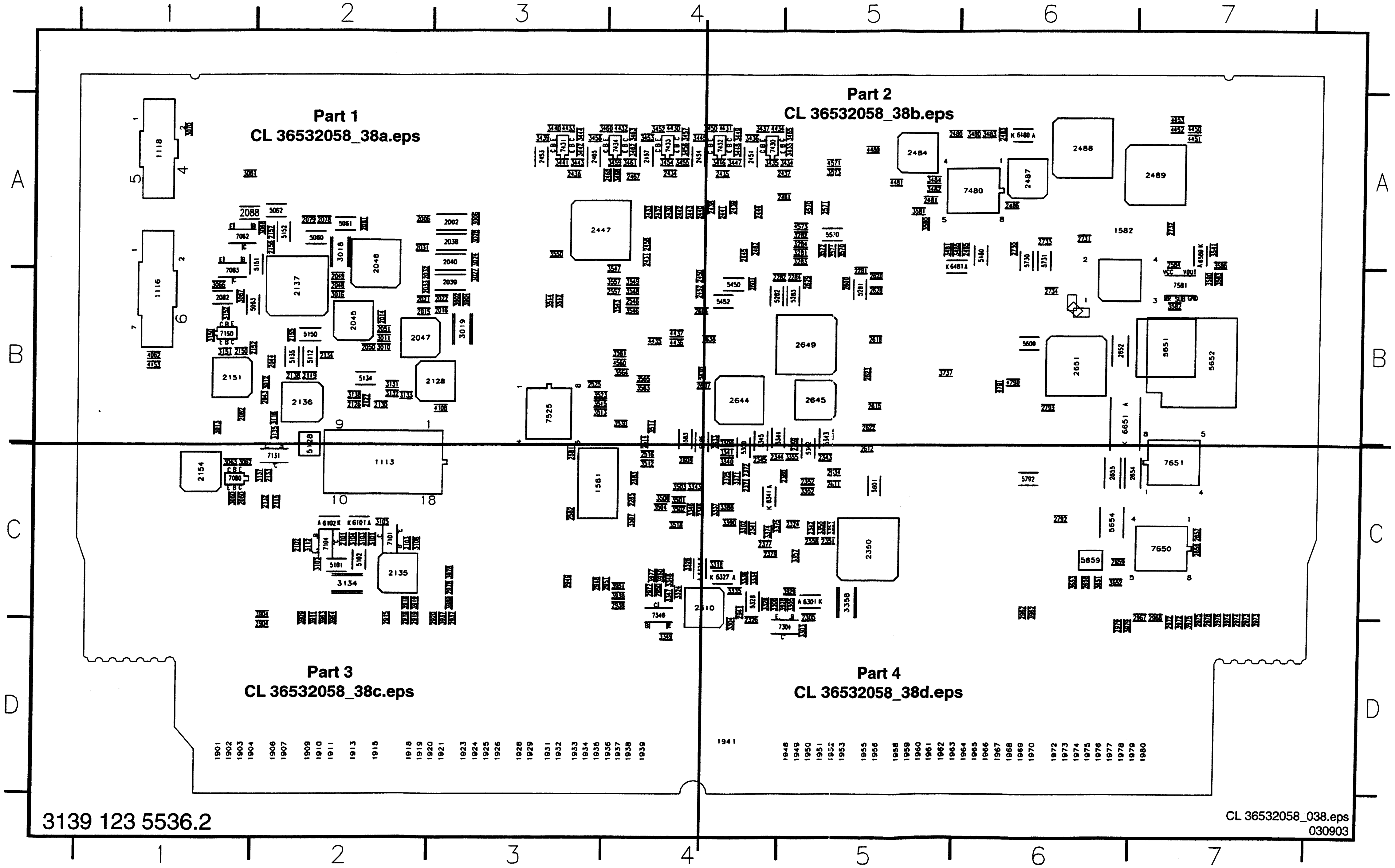
Small Signal Board: Connector Interface

0230	A8
1901	A5
1902	A5
1903	B5
1904	A2
1906	B5
1907	C5
1909	C5
1910	D5
1911	D5
1913	D5
1915	E5
1918	B2
1919	B2
1920	B2
1921	C2
1923	C2
1924	D2
1925	D2
1926	E2
1928	E2
1929	E2
1931	G6
1932	F2
1933	F2
1934	G2
1935	G2
1936	H2
1937	H2
1938	H2
1939	H6
1941	H13
1948	H13
1949	H13
1950	G13
1951	G13
1952	H10
1953	G10
1955	G10
1956	F10
1958	F10
1959	F10
1960	E10
1961	E10
1962	F13
1963	D10
1964	D10
1965	C10
1966	C10
1967	F13
1968	E13
1969	B10
1970	B10
1972	E13
1973	E13
1974	D13
1975	D13
1976	C13
1977	C13
1978	C13
1979	B13
1980	B13
2904	A2
2915	E5
2918	B2
2919	B2
2920	B2
2932	F2
2933	F2
2935	G2
2936	H2
2937	H2
2938	H2
2941	H13
2948	H13
2949	H13
2950	G13
2951	G13
2962	F13
2967	F13
2968	E13
2972	E13
2973	E13
2974	D13
2975	D13
2976	C13
2977	C13
2978	C13
2979	B13
3904	A2
3909	C4
3911	D4
3918	A2
3919	B2
3928	E2
3929	E2
3935	G2
3937	H2
3938	H2
3939	H5
3950	G13
3951	G13
3962	F13
3963	D11
3964	D11
3972	E13
3973	D13
3974	D13
3975	D13
3976	C13
3977	C13
3978	B13
3979	B13
3980	A13
F901	A7
F902	A7
F903	A7
F904	A7
F905	A7
F906	B7
F907	B7
F909	B7
F910	B7
F911	B7
F913	C7
F915	C7
F918	C7
F919	C7
F920	D7
F921	D7
F923	D7
F924	D7
F925	D7
F926	D7
F928	E7
F929	E7
F931	E7
F932	E7
F933	E7
F935	F7
F936	F7
F937	F7
F938	F7
F939	F7
F940	G8
F941	F8
F943	F8
F944	F8
F947	F8
F948	E8
F949	E8
F950	E8
F951	E8
F952	E8
F953	E8
F955	D8
F956	D8
F958	D8
F959	D8
F960	D8
F961	D8
F962	C8
F963	C8
F964	C8
F965	C8
F966	C8
F967	C8
F968	C8
F969	B8
F970	B8
F972	B8
F973	B8
F974	B8
F975	B8
F976	A8
F977	A8
F978	A8
F979	A8
F980	A8

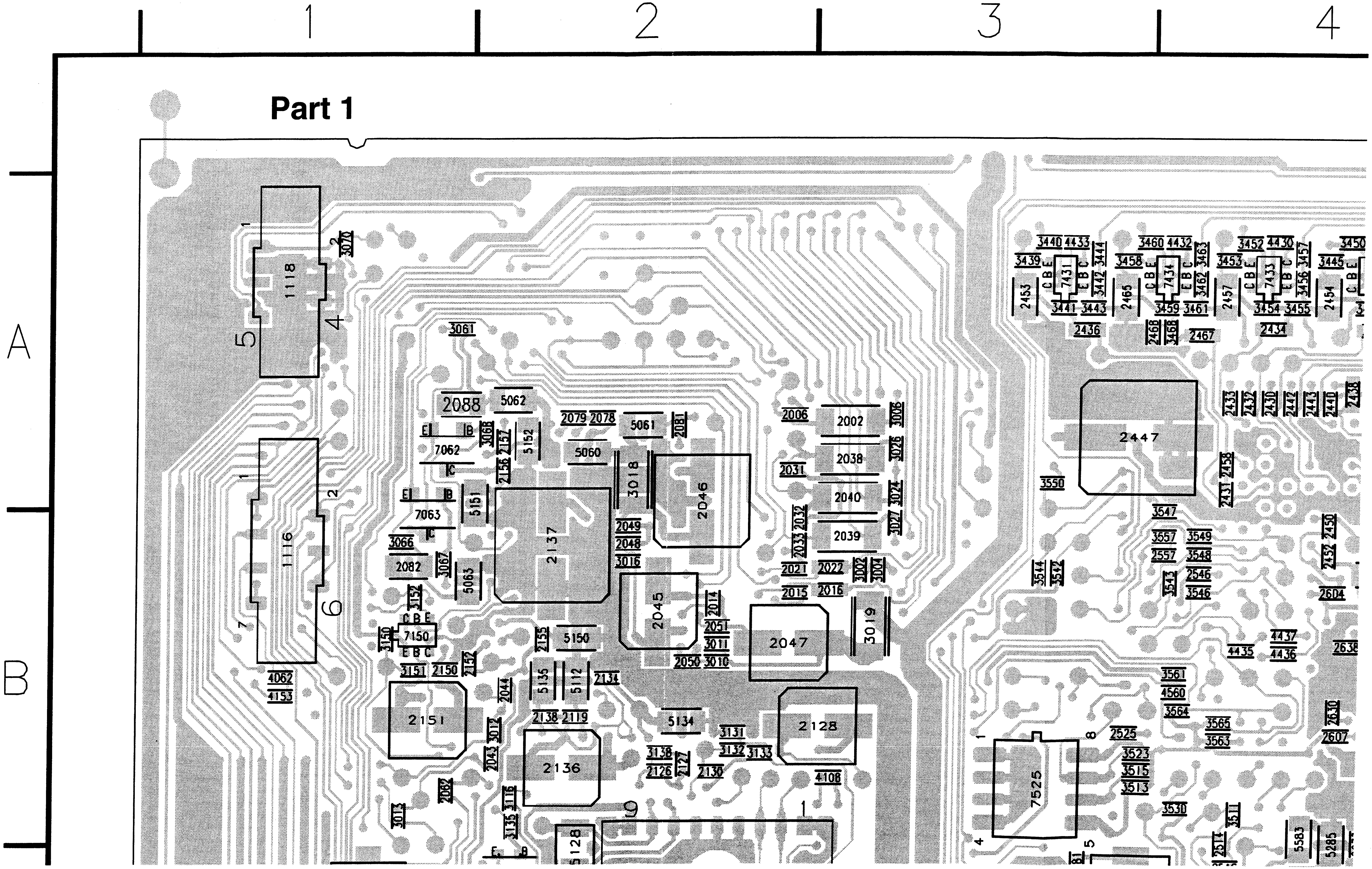

B18 SSB-CONNECTOR INTERFACE
TO/FROM 1205 OF LSSB
A8
0230
CON-BOARD-EDGE
FBL-SC1-IN B5-45
STATUS1_PIP-AFT_PIP-50-60HZ B11-118
SEL-SVHS-RR_STATUS2 B11-119
COMM_LINE B11-111
CUTOFF B7-79
B-CRT B7-77
G-CRT B7-76
R-CRT B7-75
LINEDRIVE1 B8-82
FRAMEDRIVE+ B8-88
FRAMEDRIVE- B8-89
HFB_X-RAY-PROT B8-83
B9-92
EHT-INFO B8-84
B9-91
TILT B11-112
STAND-BY B11-115
LIGHTSENSOR B11-120
DTV_EXPANSION B11-106
ADOC
B-SC1-IN_U-IN B2-24
G-SC1-IN_Y-IN B2-23
R-SC1_V-IN B2-22
Y-CVBS-SC2_AV2-IN B2-17
C-SC2_SVHS-IN B2-18
CVBS-SC2_MON-OUT B2-30
CVBS-SC1_AV1-IN B2-16
CVBS_TER_OUT B2-29
IF-TER B1-5
B1-9
AGC B1-11
EW-DRIVE B4-71
PIP_AUDIO B4-71
MPIF
+3V3
+5V
+8V
+5V2
R-CL_VL-OUT B3-60
L-CL_VL-OUT B3-61
R-FRONT-IN B3-54
L-FRONT-IN B3-52
C-FRONT-IN B2-20
Y-CVBS-FRONT-IN B2-19
R-SC1_AV-OUT B3-67
R-SC1_AV1-IN B3-49
R-SC2-OUT B3-57
R-SC2_AV2-IN B3-51
L-SC1_AV-OUT B3-66
L-SC2-OUT B3-56
L-SC2_AV2-IN B3-50
L-SC1_AV1-IN B3-48
MPIF
DEGAUSS B11-114
KEYBOARD B11-116
RC5 B11-113
ON-OFF-LED B11-107
AUDIO-R B10-94
AUDIO-L B10-95
AUDIO-SW B10-96
AUDIO-C B10-97
AUDIO-SURR B10-98
HEADPHONE-R B10-99
HEADPHONE-L B10-100
FRONT-DETECT B11-117
SOUND-ENABLE_1
SOUND-ENABLE B11-108
POR_FLASH_1
POR_FLASH B8-87
B11-121
SCL0 B11-110
SDA0 B11-109
Y-SCAVEM B7-78
ADOC
F911 500mV / div DC 20µs / div
F913 500mV / div AC 10µs / div
F923 1 V / div DC 10µs / div
F924 1 V / div DC 10µs / div
F925 1 V / div DC 10µs / div
F926 1 V / div DC 10µs / div
F928 500mV / div DC 5ms / div
F929 500mV / div DC 5ms / div
F931 1 V / div DC 5ms / div
F941 2 V / div DC 20µs / div
F967 200mV / div AC 1ms / div
F968 200mV / div AC 1ms / div
F969 500mV / div AC 1ms / div
F970 500mV / div AC 1ms / div
3139 123 5536.2
CL 36532058_037.eps 211103

Layout SSB (Overview LOT Side)

1113	C2
1116	B1
1118	A1
1581	C3
1582	A6
2002	A3
2006	A2
2014	B2
2015	B2
2016	B3
2021	B2
2022	B3
2031	A2
2032	B2
2033	B2
2038	A3
2039	B3
2040	A3
2043	B2
2044	B2
2045	B2
2046	A2
2047	B2
2048	B2
2049	B2
2050	B2
2051	B2
2060	C1
2062	B1
2078	A2
2079	A2
2081	A2
2082	B1
2088	A1
2101	C2
2102	C2
2103	C2
2115	C2
2119	B2
2126	B2
2127	B2
2128	B3
2130	B2
2132	C2
2133	C2
2134	B2
2135	C2
2136	B2
2137	B2
2138	B2
2150	B1
2151	B1
2152	B1
2154	C1
2155	B2
2156	A2
2157	A2
2281	B5
2282	B4
2284	B5
2285	C4
2300	B4
2305	C5
2310	C4
2324	C5
2325	C4
2326	D4
2341	C4
2342	C5
2343	C5
2344	C4
2345	C4
2346	C4
2350	C5
2351	C5
2352	C5
2358	C5
2359	C5
2360	C5
2371	C4
2372	C4
2377	C4
2379	C4
2430	A4
2431	A4
2432	A4
2433	A4
2434	A4
2435	A4
2436	A3
2437	A5
2438	A4
2439	A4
2440	A4
2441	A4
2442	A4
2443	A4
2444	A4
2445	A4
2447	A3
2450	B4
2451	A4
2452	B4
2453	A3
2454	A4
2457	A4
2458	A4
2461	A5
2462	A4
2465	A3
2467	A4
2468	A3
2480	A5
2481	A5
2483	A6
2484	A5
2485	A6
2486	A6
2487	A6
2488	A6
2489	A7
2514	B4
2516	C4
2525	B3
2546	B4
2557	B4
2571	A5
2581	C3
2582	C3
2583	C4
2584	A7
2600	B5
2601	B4
2604	B4
2607	B4
2609	C4
2611	C5
2612	C5
2615	B5
2618	B5
2620	B5
2622	B5
2623	B5
2628	B5
2629	B5
2630	B4
2633	B4
2634	C5
2638	B4
2644	B4
2645	B5
2649	B5
2651	B6
2652	B6
2654	C6
2655	C6
2656	C7
2657	C7
2658	C6
2659	C6
2730	A6
2731	A6
2732	A7
2733	A6
2734	B6
2792	C6
2793	B6
2904	D2
2915	D2
2918	D2
2919	D2
2920	D3
2937	D3
2938	C4
2941	C4
2948	C3
2949	C3
2950	C4
2951	C4
2962	C6
2967	C7
2968	C7
2972	D7
2973	D7
2974	D7
2975	D7
2976	D7
2977	C4
2978	C3
2979	D6
3002	B3
3004	B3
3006	A3
3010	B2
3011	B2
3012	B2
3013	B1
3016	B2
3018	A2
3019	B3
3024	A3
3026	A3
3027	B3
3060	C1
3061	A1
3062	C1
3063	C1
3066	B1
3067	B1
3068	A2
3070	A1
3101	C2
3102	C2
3103	C2
3104	C2
3105	C2
3106	C2
3112	C2
3116	B2
3131	B2
3132	B2
3133	B2
3134	C2
3135	B2
3137	C2
3138	B2
3150	B1
3151	B1
3152	B1
3281	A5
3282	A5
3283	A5
3284	A5
3302	C4
3303	D5
3304	D4
3305	C5
3306	C4
3318	C4
3324	C4
3326	C4
3328	C4
3334	C4
3335	C4
3336	C4
3337	C4
3340	C4
3341	C4
3343	C4
3346	C4
3347	C4
3348	C4
3349	D4
3350	C5
3351	C5
3352	C5
3355	C5
3357	C5
3358	C5
3371	C4
3374	C4
3375	C4
3388	C4
3390	C4
3433	A5
3434	A5
3435	A4
3436	A4
3437	A4
3439	A3
3440	A3
3441	A3
3442	A3
3443	A3
3444	A3
3445	A4
3446	A4
3447	A4
3448	A4
3449	A4
3450	A4
3452	A4
3453	A4
3454	A4
3455	A4
3456	A4
3457	A4
3458	A3
3459	A4
3460	A3
3461	A4
3462	A4
3463	A4
3465	A5
3468	A4
3480	A6
3481	A5
3482	A5
3483	A6
3484	A5
3485	A5
3501	C4
3502	C4
3503	C4
3504	C4
3507	C4
3508	C4
3511	B4
3512	C4
3513	B3
3515	B3
3518	C4
3523	B3
3530	B4
3541	A7
3542	B3
3543	B4
3544	B3
3546	B4
3547	B4
3548	B4
3549	B4
3550	A3
3557	B4
3561	B4
3563	B4
3564	B4
3565	B4
3570	A5
3571	A5
3572	A5
3573	A5
3580	A5
3581	A5
3582	B7
3583	B7
3586	A7
3590	B7
3651	C6
3652	C6
3653	C6
3737	B5
3904	C2
3909	D2
3911	D2
3918	C2
3919	C2
3928	C5
3929	C5
3937	D3
3938	C4
3950	C4
3951	C4
3962	C6
3963	D2
3964	D2
3972	D7
3973	D7
3974	D7
3975	D7
3976	D7
3977	C4
3978	C3
3979	D6
3980	C3
4062	B1
4108	B3
4153	B1
4430	A4
4431	A4
4432	A4
4433	A3
4434	A4
4435	B4
4436	B4
4437	B4
4450	A7
4451	A7
4452	A7
4453	A7
4480	A5
4481	A5
4560	B4
4570	A5
4571	A5
4573	A5
4790	B6
4791	B6
5060	A2
5061	A2
5062	A2
5063	B1
5101	C2
5102	C2
5112	B2
5128	C2
5134	B2
5135	B2
5150	B2
5151	A2
5152	A2
5281	B5
5282	B4
5283	B5
5285	B4
5300	C4
5328	C4
5342	C5
5343	B5
5344	B4
5345	B4
5450	B4
5452	B4
5480	A6
5570	A5
5583	B4
5600	B6
5601	C5
5651	B7
5652	B7
5654	C6
5659	C6
5730	A6
5731	A6
5792	C6
6101	C2
6102	C2
6301	C5
6326	C4
6327	C4
6341	C4
6480	A6
6481	A5
6589	A7
6651	B6
7060	C1
7062	A1
7063	B1
7101	C2
7104	C2
7131	C2
7150	B1
7304	D5
7346	C4
7430	A4
7431	A3
7432	A4
7433	A4
7434	A4
7480	A6
7525	B3
7581	B7
7650	C7
7651	C7

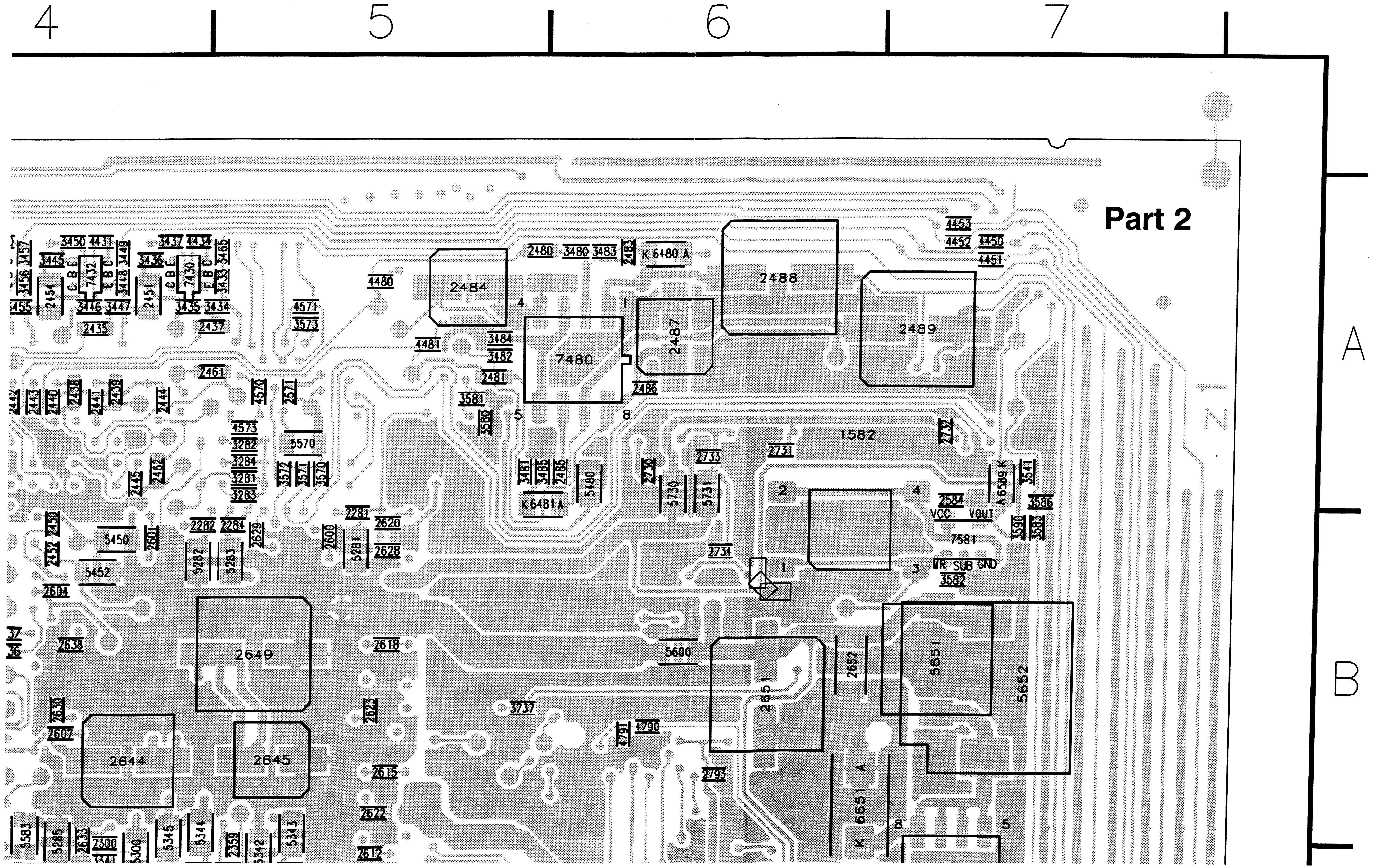


Layout SSB (Part 1 LOT Side)


1
2
3
4
A
B
Part 1
1118
1116
3061
2088
5062
7062
7063
5151
2137
3018
2046
2045
2047
3019
2002
2038
2040
2039
2006
2031
2447
7431
7434
7433
2151
2136
2128
7525
5134
5150
5135
5112
7150
3066
2082
5063
5060
5061
2079
2078
2081
3550
3547

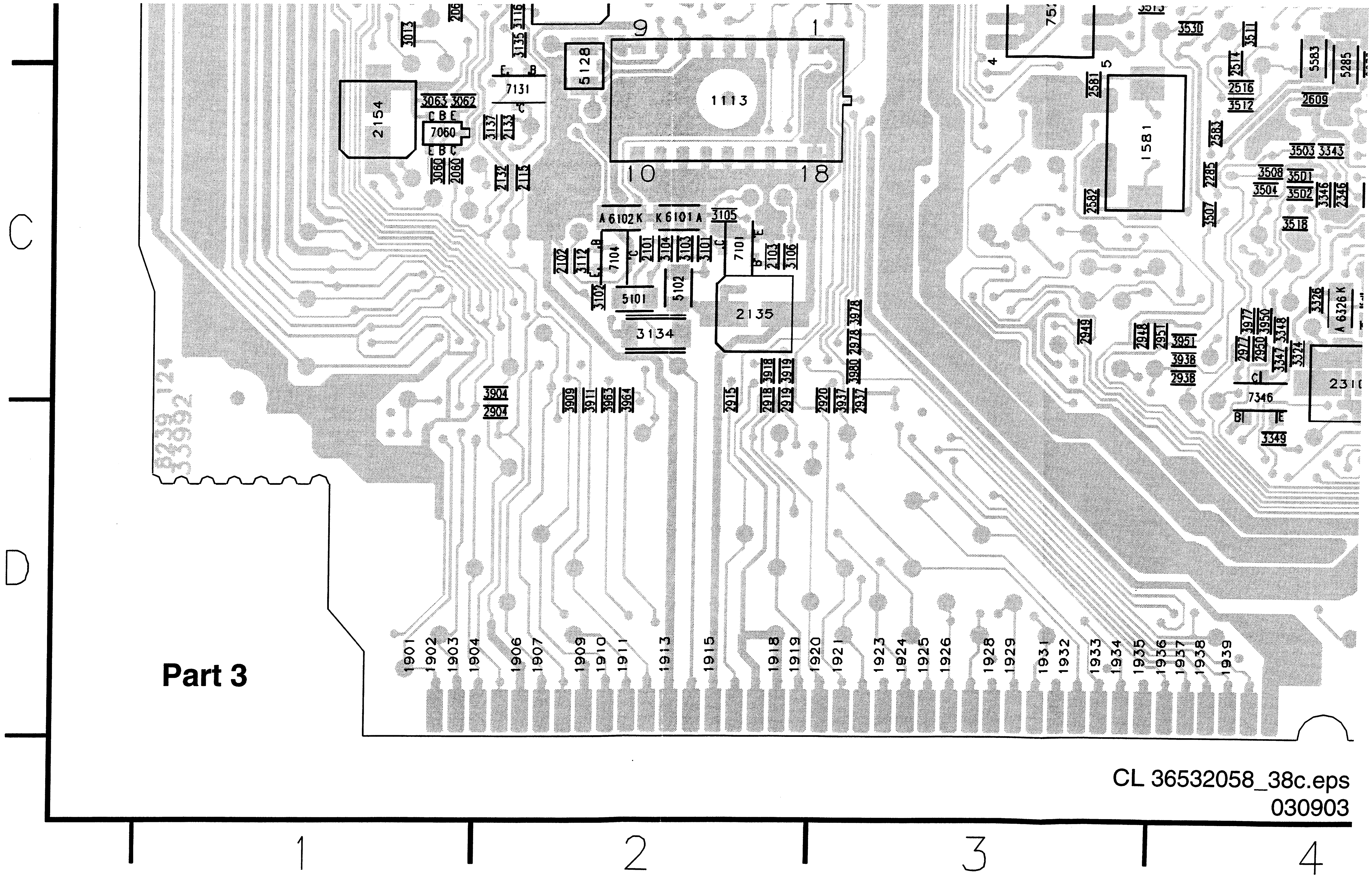
CL 36532058_38a.eps
030903

Layout SSB (Part 2 LOT Side)


4
5
6
7
A
B
Part 2
2484
7480
2487
2488
2489
1582
2649
2644
2645
2651
2652
5651
5652
5570
5450
5452
5600
5730
5731
5480
K 6480 A
K 6481 A
K 6651 A
A 6589 K
7581
VCC VOUT
WR SUB GND
7432
7430
2480
3480
3483
2483
4453
4452
4450
4451
4480
4481
3484
3482
2481
3581
3580
2486
3450
4431
3437
4434
3445
3436
3446
3447
3435
3434
2435
2437
2454
2451
4571
3573
2461
4570
2571
4573
3282
3284
3281
3283
3572
3571
3570
3481
3485
2485
2730
2733
2731
2732
2734
2584
3541
3586
3590
3583
3582
2281
2620
2282
2284
2629
2600
5281
2628
5282
5283
2601
2450
2452
2604
2443
2462
2442
2441
2440
2438
2439
2444
2638
2618
2623
3737
4791
4790
2793
2630
2607
2615
2622
2612
5583
5285
2633
2300
5300
5345
5344
2358
5342
5343
1
2
3
4
5
8

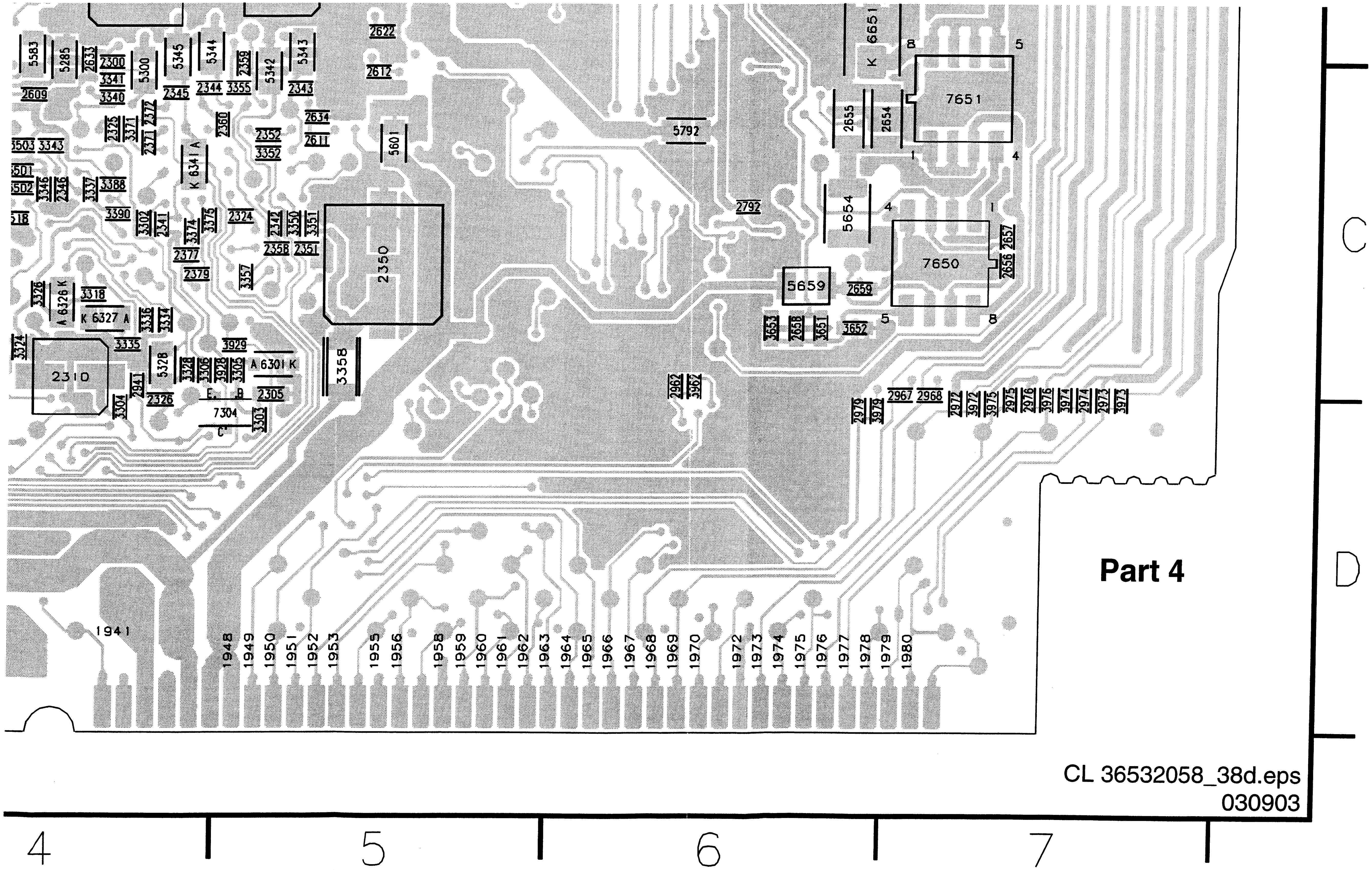
CL 36532058_38b.eps
030903

Layout SSB (Part 3 LOT Side)


C
D
1
2
3
4
Part 3
3013
3135
3116
5128
9
1
1113
10
18
7131
E
B
C
2154
3063
3062
7060
3060
2060
3137
2133
2132
2113
A 6102 K
K 6101 A
3105
2102
3112
7104
2101
3104
3103
3101
7101
2103
3106
3102
5101
5102
2135
3134
3904
2904
3909
3911
3963
3964
2915
2918
3918
2919
3919
2920
3937
3980
2937
2978
3978
4
5
2581
2582
1581
3530
3511
2514
2516
3512
5583
5285
2609
2583
2285
3507
3508
3504
3501
3502
3503
3343
3346
2346
3518
2949
2918
2951
3951
3938
2938
2977
3977
2950
3950
3347
3348
3324
3326
A 6326 K
7346
2310
3349
1901
1902
1903
1904
1906
1907
1909
1910
1911
1913
1915
1918
1919
1920
1921
1923
1924
1925
1926
1928
1929
1931
1932
1933
1934
1935
1936
1937
1938
1939
5239 124
33992

CL 36532058_38c.eps
030903

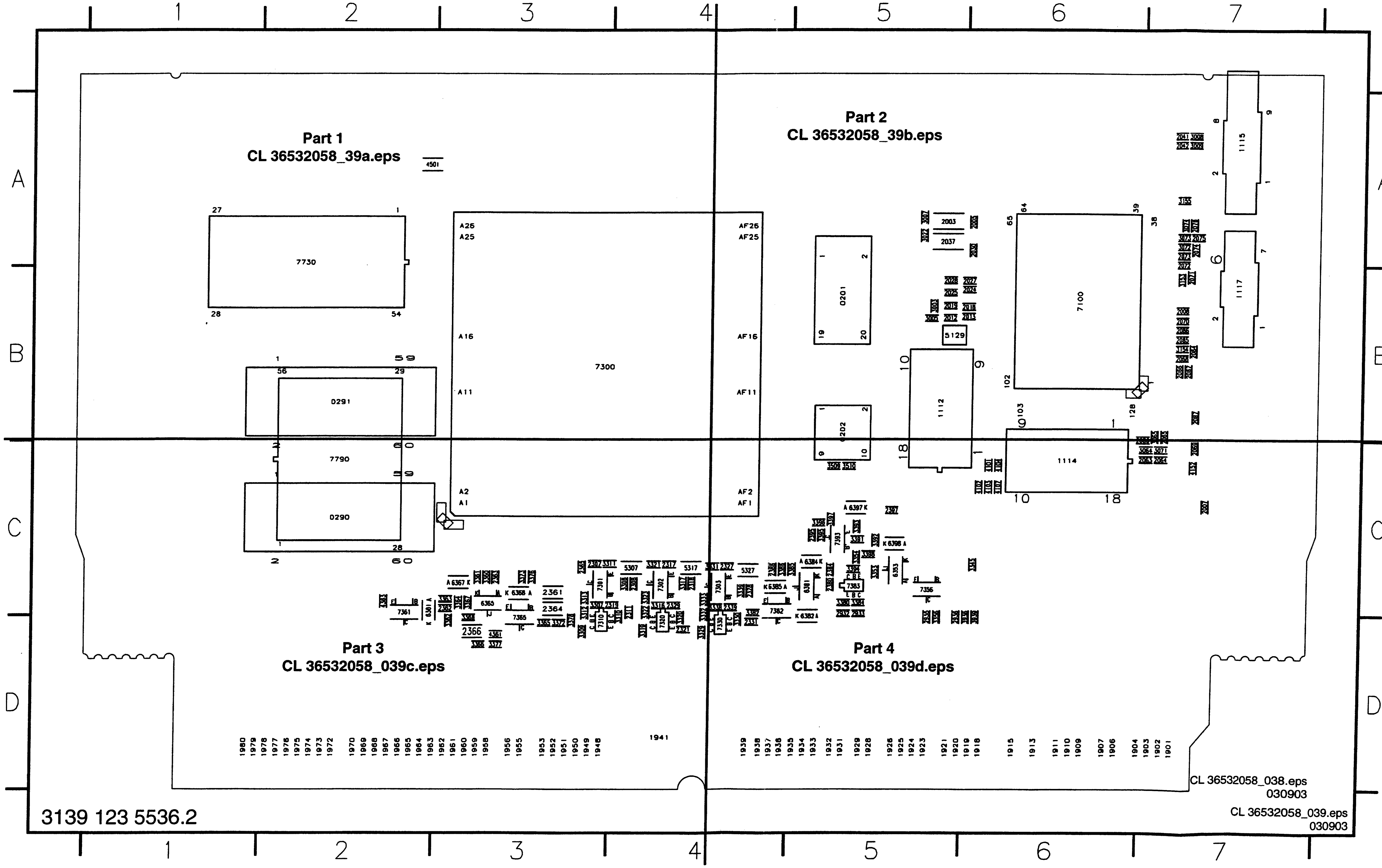
Layout SSB (Part 4 LOT Side)


5583
5285
2633
2300
3341
3340
2609
5300
5345
5344
2358
5342
5343
2345
2344
3355
2343
2622
2612
6651
K
7651
2655
2654
5792
5601
2634
2611
2352
3352
2360
2325
3371
2372
2371
3503
3343
3501
3502
3346
2346
3337
3388
K 6341 A
3390
3302
2341
3374
3376
2324
2342
3350
3351
2358
2351
2350
2377
2379
3357
2792
5654
7650
2657
2656
5659
2659
3653
2658
3651
3652
3518
3326
A 6326 K
3318
K 6327 A
3336
3334
3324
3335
3929
2310
5328
3328
3306
3928
3305
A 6301 K
3358
2341
3304
2326
E
B
2305
7304
C
3303
2962
3962
2979
3979
2967
2968
2977
3977
3975
2925
2976
3976
2974
3974
2973
3973
8
5
1
4
1941
1948
1949
1950
1951
1952
1953
1955
1956
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1972
1973
1974
1975
1976
1977
1978
1979
1980
Part 4
C
D
4
5
6
7

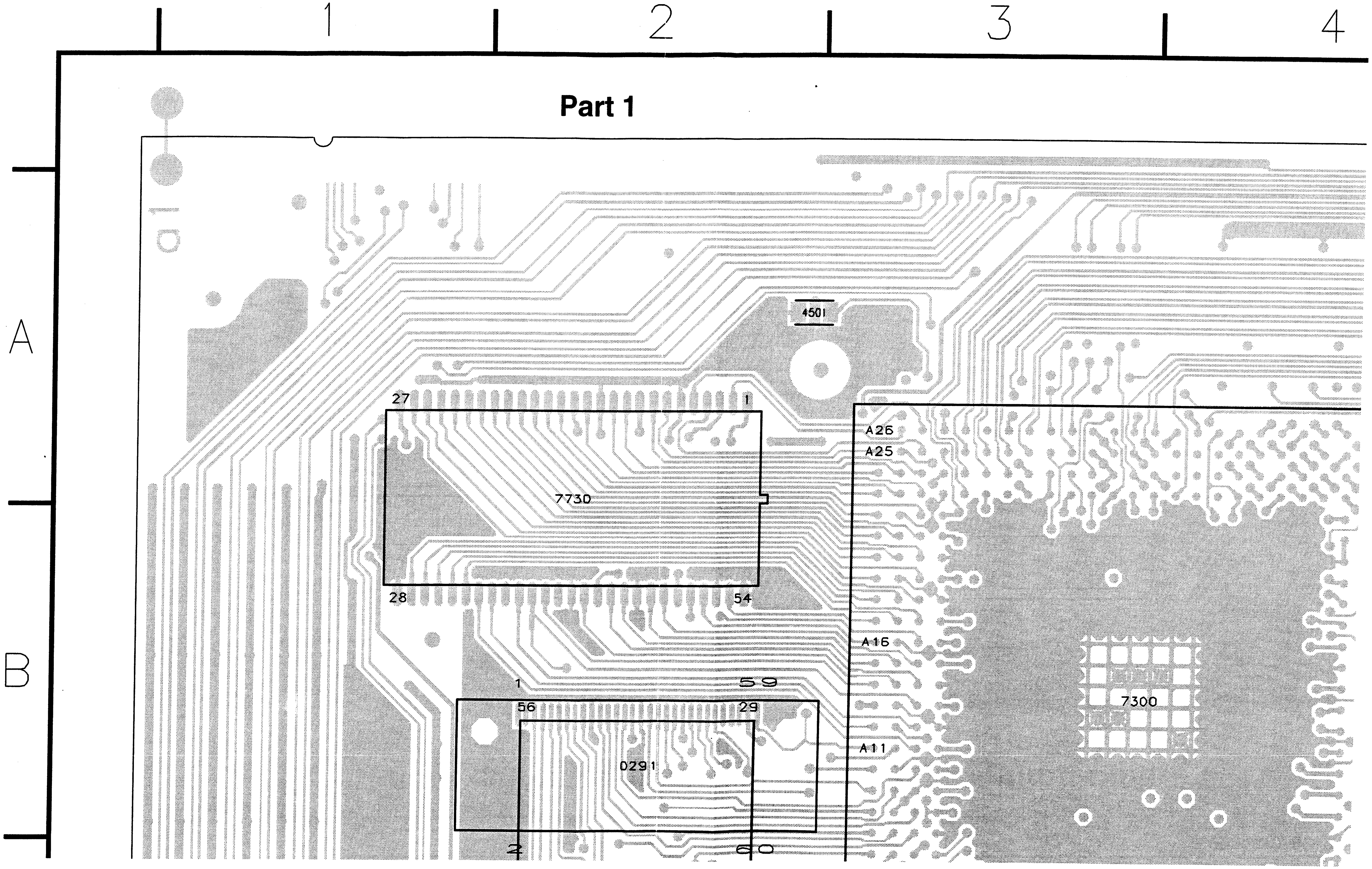
CL 36532058_38d.eps
030903

Layout SSB (Overview Tuner Side)

0201	B5
0202	B5
0290	C2
0291	B2
1112	B5
1114	C6
1115	A7
1117	B7
1901	D7
1902	D7
1903	D7
1904	D6
1906	D6
1907	D6
1909	D6
1910	D6
1911	D6
1913	D6
1915	D6
1918	D6
1919	D6
1920	D5
1921	D5
1923	D5
1924	D5
1925	D5
1926	D5
1928	D5
1929	D5
1931	D5
1932	D5
1933	D5
1934	D5
1935	D5
1936	D4
1937	D4
1938	D4
1939	D4
1941	D4
1948	D3
1949	D3
1950	D3
1951	D3
1952	D3
1953	D3
1955	D3
1956	D3
1958	D3
1959	D3
1960	D3
1961	D3
1962	D3
1963	D2
1964	D2
1965	D2
1966	D2
1967	D2
1968	D2
1969	D2
1970	D2
1972	D2
1973	D2
1974	D2
1975	D2
1976	D2
1977	D2
1978	D2
1979	D1
1980	D1
2003	A5
2005	A6
2007	C7
2008	B7
2012	B5
2013	B6
2018	B6
2019	B5
2024	B6
2025	B5
2027	B6
2028	B5
2030	A6
2037	A5
2041	A7
2042	A7
2063	C7
2064	C7
2065	B7
2066	B7
2067	B7
2068	B7
2069	C7
2070	B7
2071	B7
2072	A7
2073	A7
2074	A7
2075	A7
2076	A7
2083	B7
2084	B7
2085	B7
2086	B7
2087	B7
2307	C3
2308	C4
2311	C4
2317	C4
2318	C4
2319	C4
2321	D4
2327	C4
2328	C4
2329	C4
2331	D4
2339	C4
2361	C3
2362	C3
2363	C3
2364	C3
2365	C3
2366	D3
2380	C5
2384	C5
2386	C4
2395	C5
2397	C5
2932	C5
2933	C5
2935	D5
2936	D5
3003	B5
3005	B5
3007	A5
3008	A7
3009	A7
3022	A5
3064	C7
3065	B7
3071	C7
3072	A7
3073	A7
3074	A7
3153	B7
3154	B7
3155	A7
3307	C3
3308	C4
3309	D3
3310	D4
3311	C3
3312	C3
3313	C3
3316	C4
3317	C4
3319	D4
3320	D4
3321	C4
3322	C4
3323	C4
3329	D4
3330	D4
3331	C4
3332	C4
3333	C4
3338	C4
3339	C4
3345	C6
3353	C5
3354	C5
3356	D5
3360	C3
3361	C3
3362	D3
3363	C3
3364	C3
3365	D3
3366	D3
3367	C3
3368	D3
3372	D3
3373	C3
3376	C3
3377	D3
3378	D3
3380	C5
3382	C4
3384	C5
3385	C5
3386	C4
3391	C5
3392	C5
3393	C5
3394	C5
3395	C5
3396	C5
3397	C5
3398	C5
3509	C5
3510	C5
3936	D6
3939	D6
4101	C6
4102	C6
4103	C6
4104	C6
4107	C6
4152	C7
4361	D3
4363	C2
4501	A2
5129	B5
5307	C4
5317	C4
5327	C4
6353	C5
6361	C2
6365	C3
6367	C3
6368	C3
6381	C5
6382	D5
6384	C5
6385	C4
6397	C5
6398	C5
7100	B6
7300	B3
7301	C3
7302	C4
7303	C4
7310	D3
7320	D4
7330	D4
7356	C5
7361	C2
7365	D3
7382	C4
7383	C5
7393	C5
7730	A2
7790	C2

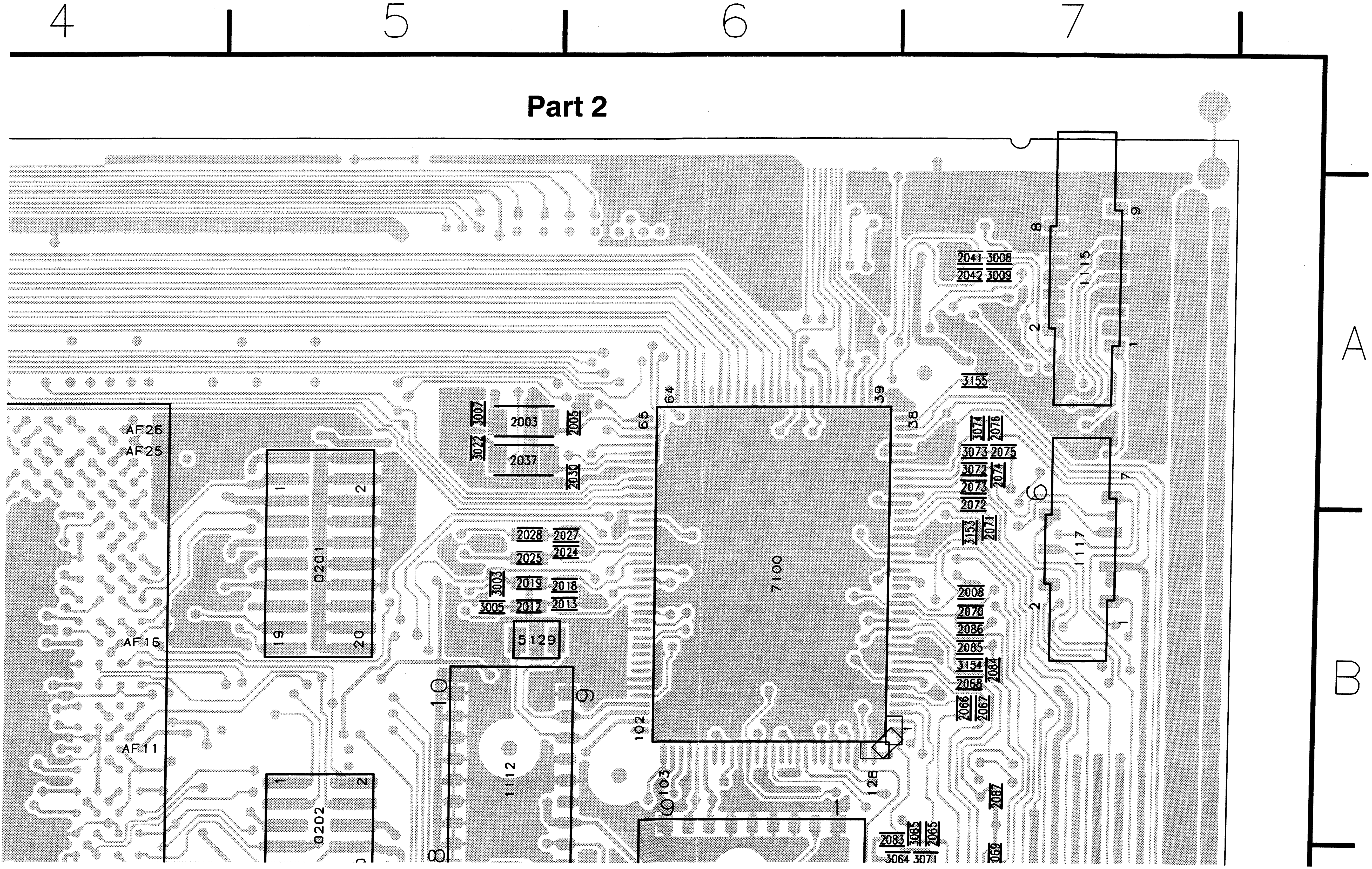

1
2
3
4
5
6
7
A
B
C
D
Part 1
CL 36532058_39a.eps
Part 2
CL 36532058_39b.eps
Part 3
CL 36532058_039c.eps
Part 4
CL 36532058_039d.eps
7730
0291
7790
0290
7300
0201
0202
1112
7100
1114
1115
1117
5129
2003
2037
4501
1941
3139 123 5536.2
CL 36532058_038.eps
030903
CL 36532058_039.eps
030903

Layout SSB (Part 1 Tuner Side)


1
2
3
4
A
B
Part 1
4501
27
1
28
54
7730
A26
A25
A16
A11
1
59
56
29
0291
2
60
7300

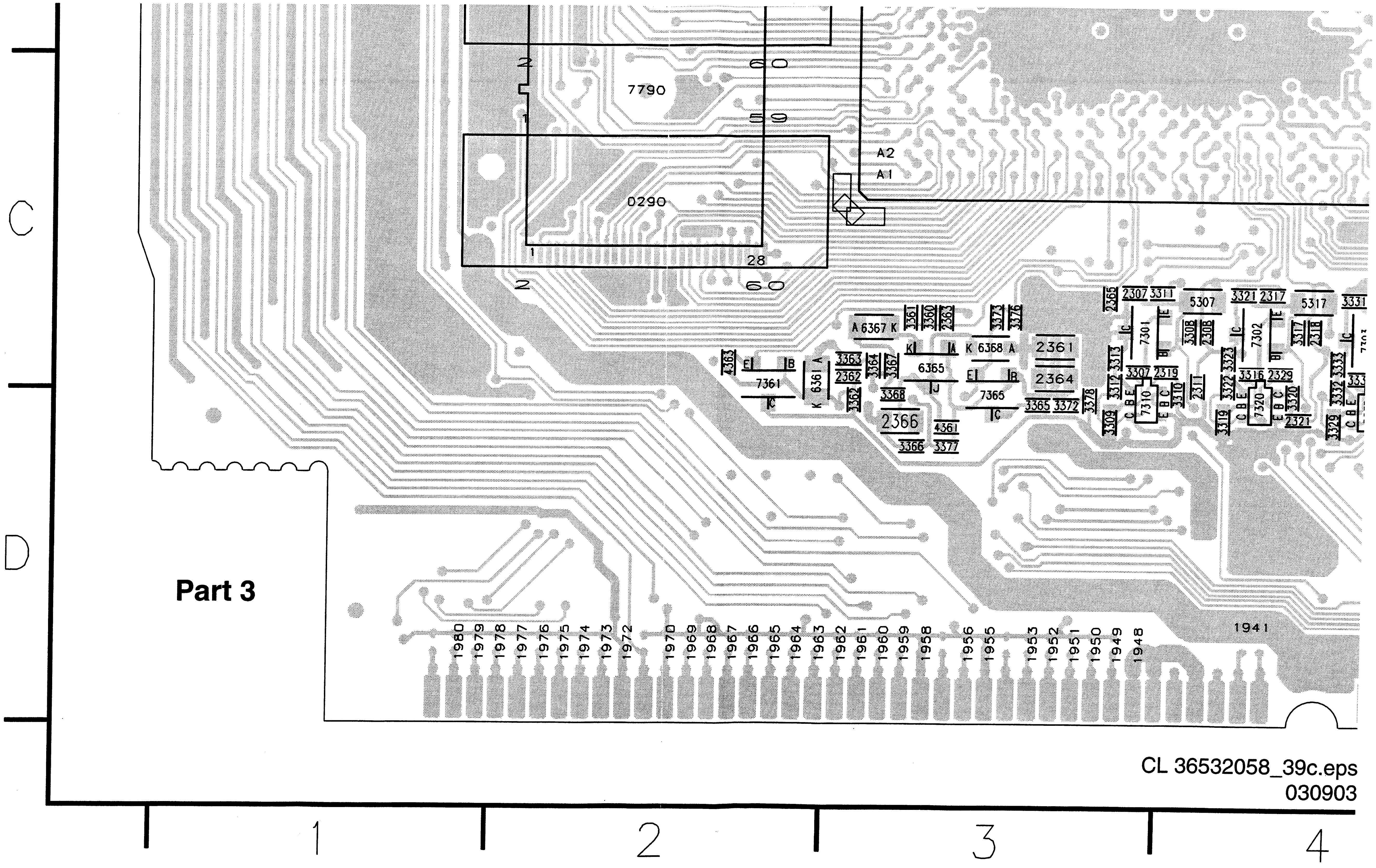
CL 36532058_39a.eps
030903

Layout SSB (Part 2 Tuner Side)


4
5
6
7
A
B
Part 2
2041 3008
2042 3009
1115
8
9
2
1
3155
64
39
65
38
3007
2003
2005
3022
2037
2030
AF26
AF25
1
2
0201
19
20
3074
3076
3073 2075
3072
2074
2073
2072
3153
2071
6
7
1117
2
1
2028 2027
2025 2024
3003
2019 2018
3005 2012 2013
5129
7100
2008
2070
2086
2085
3154
2084
2068
2066
2067
AF16
10
9
102
1
AF11
1112
103
128
2087
1
2
0202
8
2083
3065
2065
3064 3071
2069

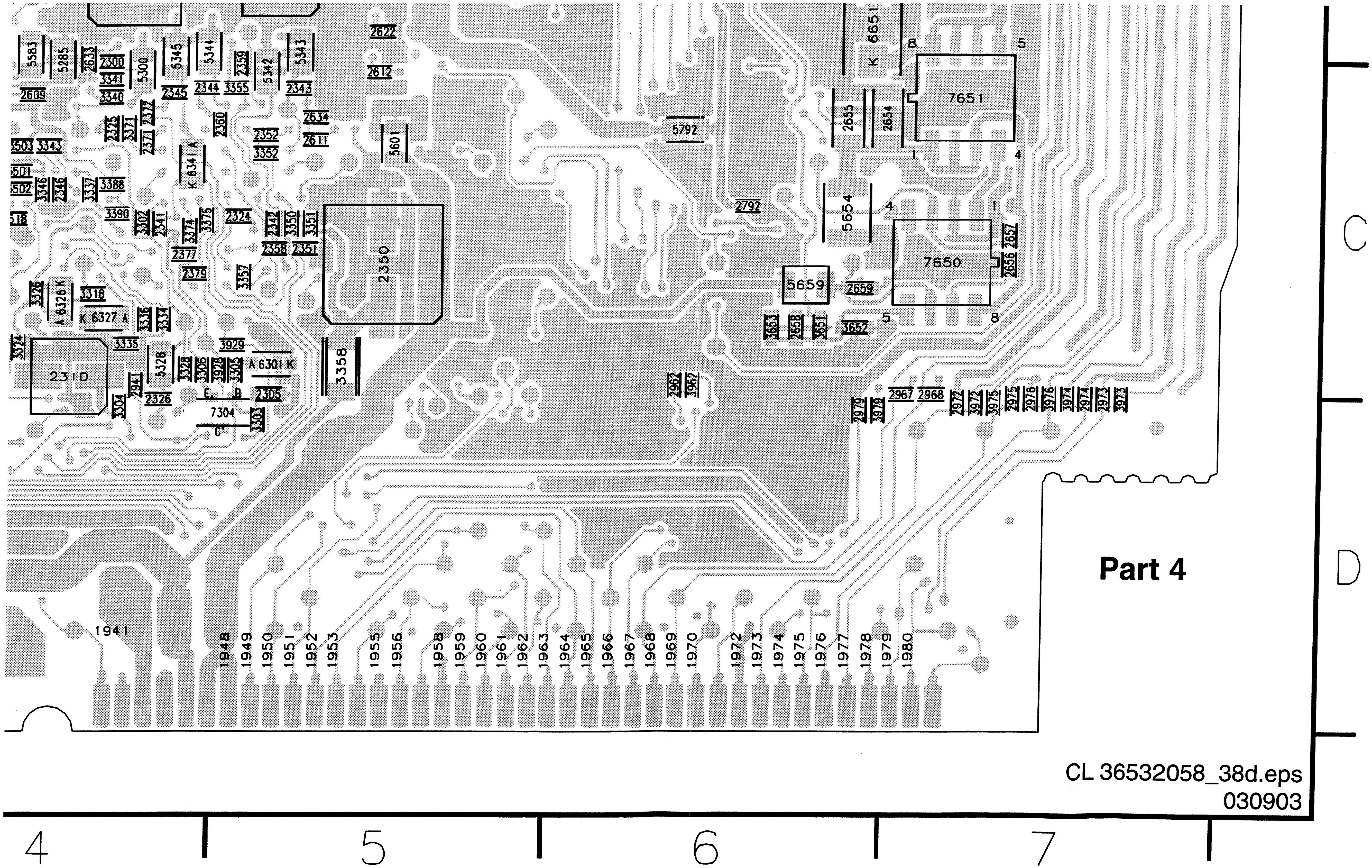
CL 36532058_39b.eps
030903

Layout SSB (Part 3 Tuner Side)


C
D
1
2
3
4
Part 3
7790
0290
2
60
59
1
28
A2
A1
6367
6361
6365
6368
7361
7365
2361
2364
2366
2362
3361
3362
3363
3364
3365
3366
3367
3368
3372
3377
3378
4361
7301
7302
7310
7320
5307
5317
2307
2317
2319
2321
2329
2311
3311
3307
3316
3321
3331
1941
1980
1979
1978
1977
1976
1975
1974
1973
1972
1970
1969
1968
1967
1966
1965
1964
1963
1962
1961
1960
1959
1958
1956
1955
1953
1952
1951
1950
1949
1948

CL 36532058_39c.eps
030903

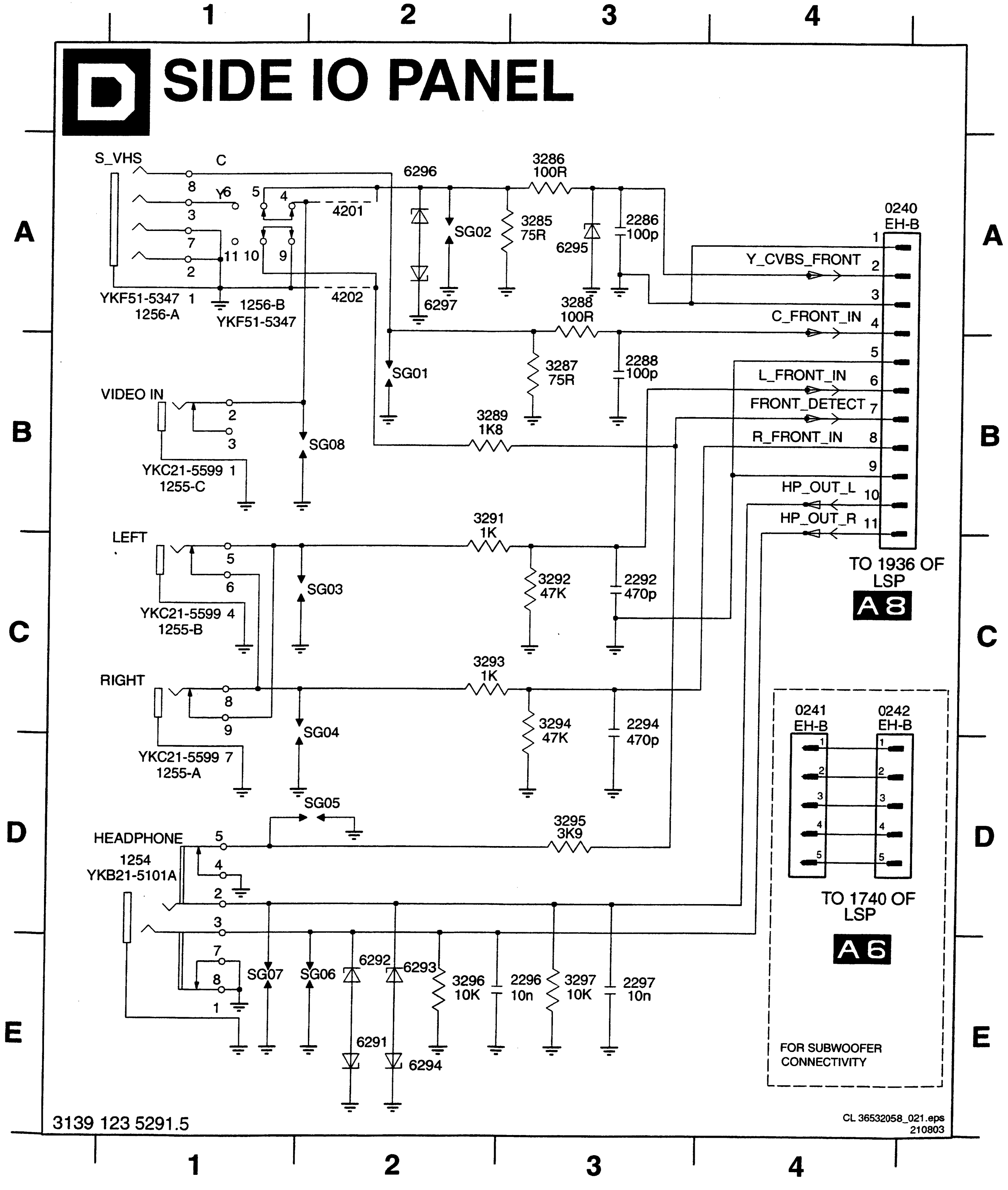
Layout SSB (Part 4 Tuner Side)


Part 4
C
D
4
5
6
7
7651
7650
2350
2310
5792
5659
5654
2655
2654
3358
5601
7304
1941
1948
1980

CL 36532058_38d.eps
030903

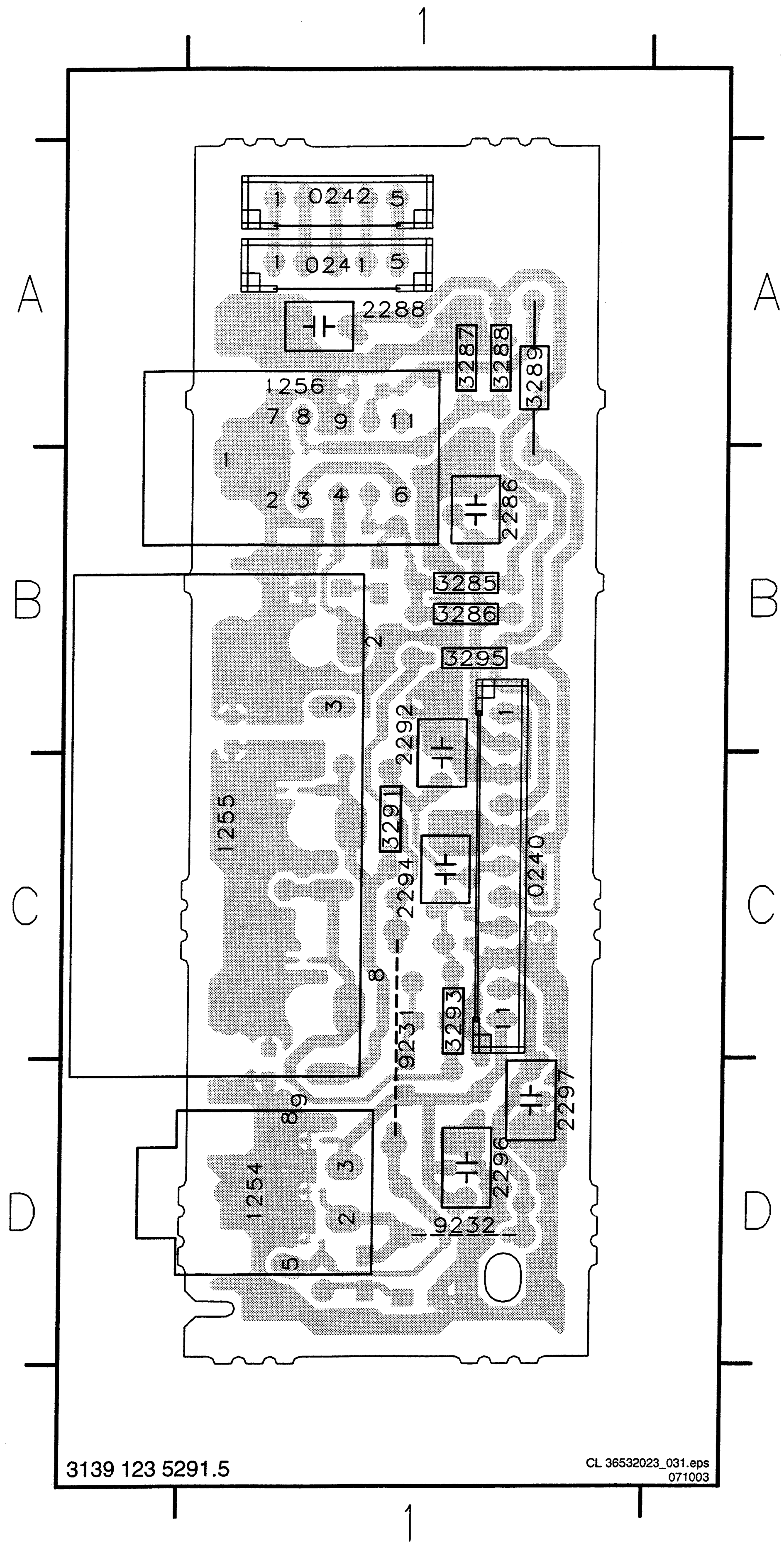
Side I/O Panel

0240	A4
0241	C4
0242	C4
1254	D1
1255-A	D1
1255-B	C1
1255-C	B1
1256-A	A1
1256-B	A1
2286	A3
2288	B3
2292	C3
2294	C3
2296	E3
2297	E3
3285	A3
3286	A3
3287	B3
3288	A3
3289	B2
3291	B2
3292	C3
3293	C2
3294	C3
3295	D3
3296	E2
3297	E3
4201	A2
4202	A2
6291	E2
6292	E2
6293	E2
6294	E2
6295	A3
6296	A2
6297	A2


1
2
3
4
A
B
C
D
E
D
SIDE IO PANEL
S_VHS
C
Y
YKF51-5347
1256-A
1256-B
YKF51-5347
4201
4202
6296
3286
100R
3285
75R
SG02
6295
2286
100p
6297
3288
100R
SG01
3287
75R
2288
100p
3289
1K8
VIDEO IN
YKC21-5599
1255-C
SG08
0240
EH-B
Y_CVBS_FRONT
C_FRONT_IN
L_FRONT_IN
FRONT_DETECT
R_FRONT_IN
HP_OUT_L
HP_OUT_R
TO 1936 OF
LSP
A8
LEFT
YKC21-5599
1255-B
SG03
3291
1K
3292
47K
2292
470p
RIGHT
YKC21-5599
1255-A
SG04
3293
1K
3294
47K
2294
470p
SG05
HEADPHONE
1254
YKB21-5101A
3295
3K9
SG07
SG06
6292
6293
3296
10K
2296
10n
3297
10K
2297
10n
6291
6294
0241
EH-B
0242
EH-B
TO 1740 OF
LSP
A6
FOR SUBWOOFER
CONNECTIVITY
3139 123 5291.5
CL 36532058_021.eps
210803

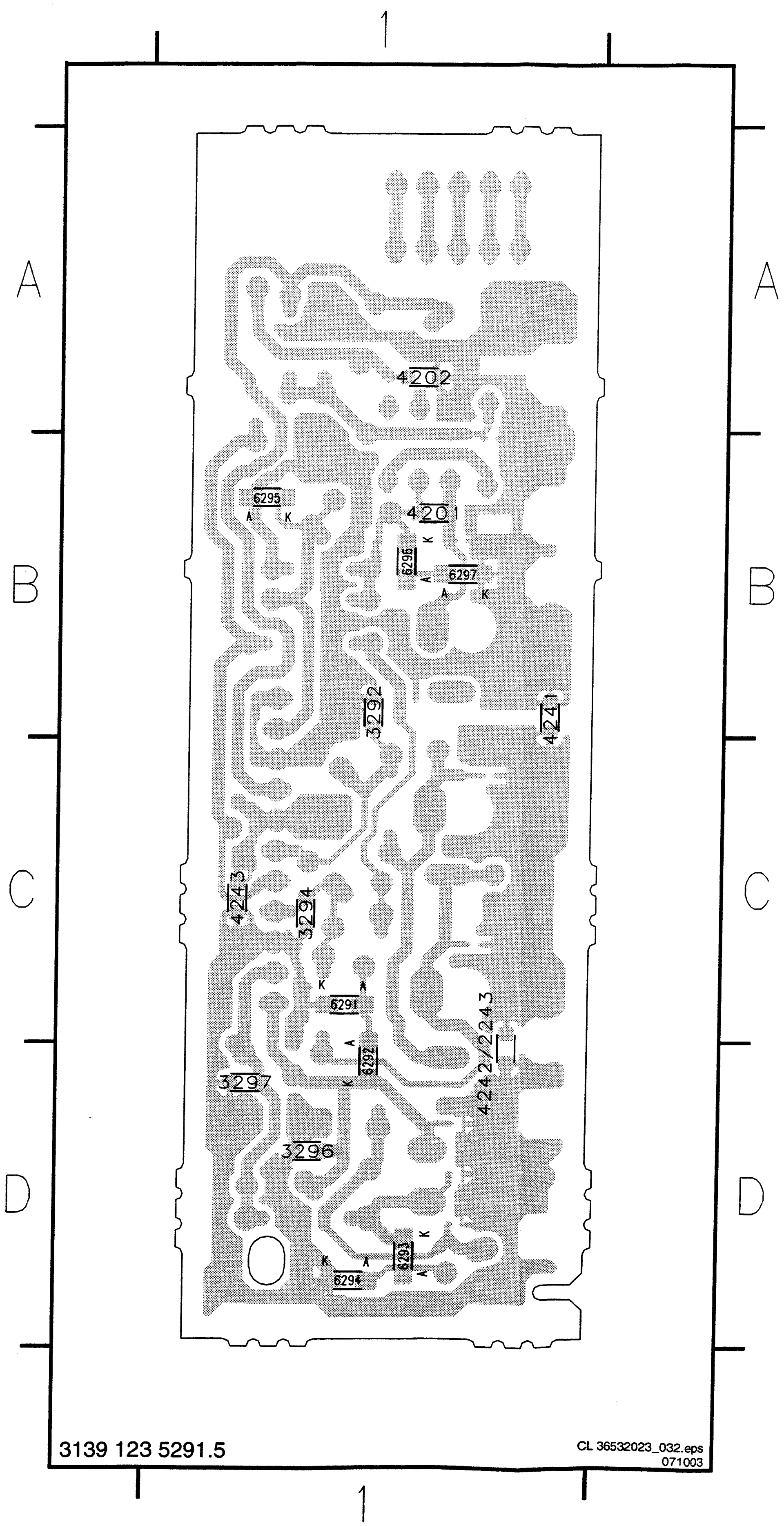
Personal Notes:

Layout Side I/O Panel (Top Side)


1
A
B
C
D
0242
0241
2288
3287
3288
3289
1256
2286
3285
3286
3295
1255
2292
3291
2294
0240
3293
9231
2297
2296
1254
9232
3139 123 5291.5
CL 36532023_031.eps
071003

0240	C1
0241	A1
0242	A1
1254	D1
1255	C1
1256	A1
2286	B1
2288	A1
2292	B1
2294	C1
2296	D1
2297	D1
3285	B1
3286	B1
3287	A1
3288	A1
3289	A1
3291	C1
3293	C1
3295	B1
9231	C1
9232	D1

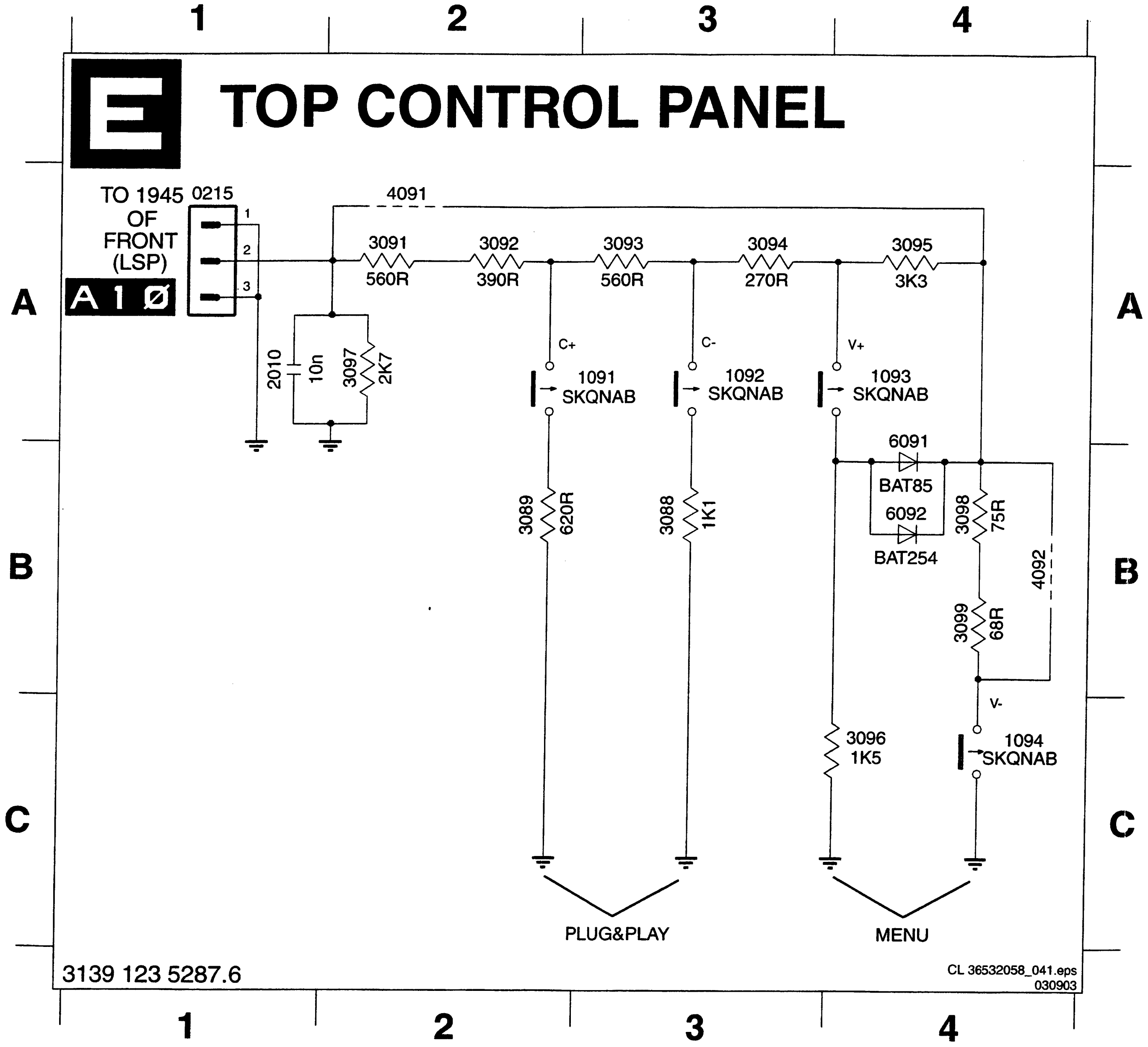
Layout Side I/O Panel (Bottom Side)


1
A
B
C
D
4202
6295
4201
6296
6297
3292
4241
4243
3294
6291
6292
3297
4242/2243
3296
6293
6294
3139 123 5291.5
CL 36532023_032.eps
071003

3292	B1
3294	C1
3296	D1
3297	D1
4201	B1
4202	A1
4241	B1
4242/2243	D1
4243	C1
6291	C1
6292	D1
6293	D1
6294	D1
6295	B1
6296	B1
6297	B1

Top Control Panel

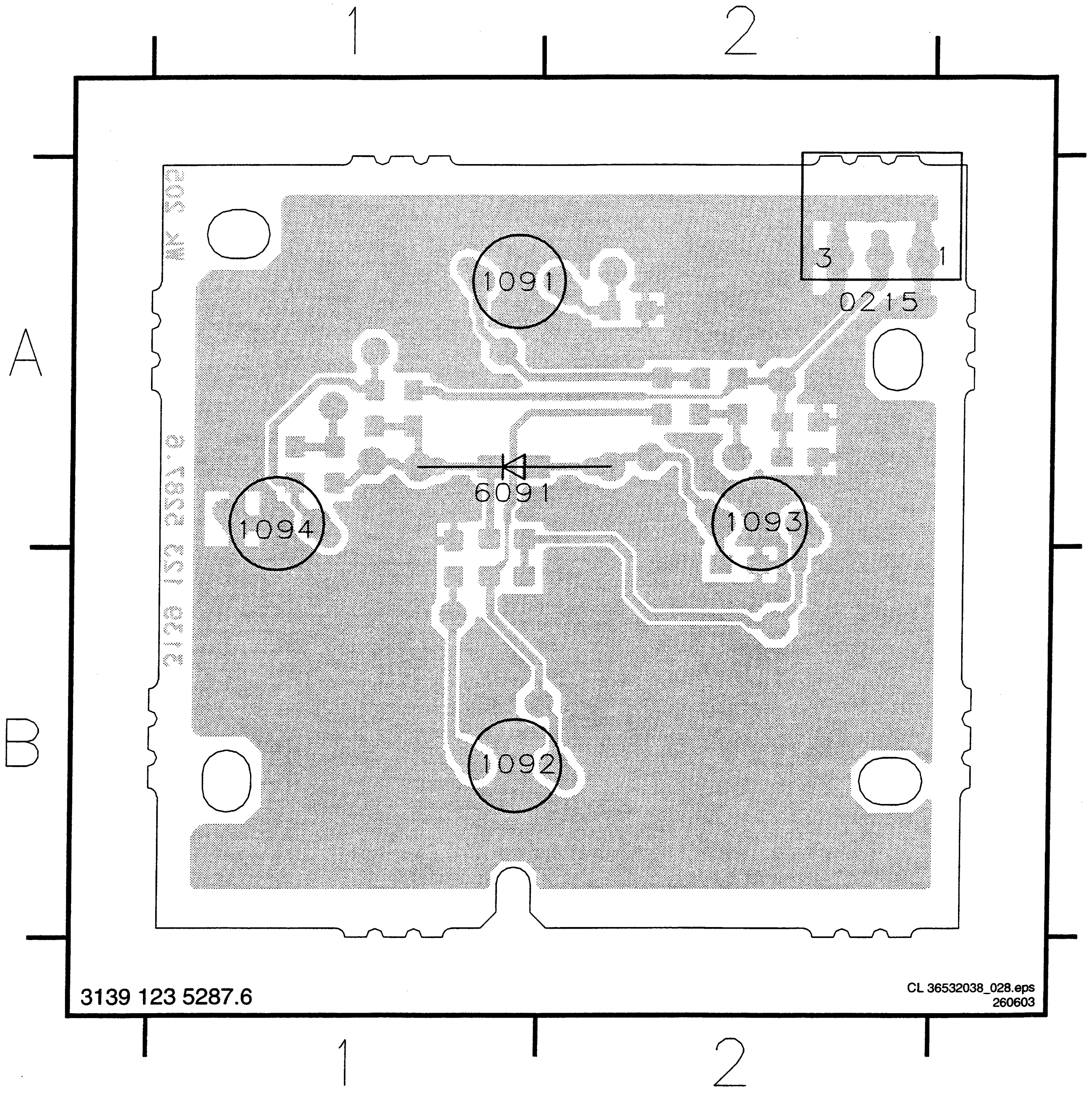
0215 A1
1091 A3
1092 A3
1093 A4
1094 C4
2010 A1
3088 B3
3089 B2
3091 A2
3092 A2
3093 A3
3094 A3
3095 A4
3096 C4
3097 A2
3098 B4
3099 B4
4091 A2
4092 B4
6091 B4
6092 B4


1
2
3
4
A
B
C
E
TOP CONTROL PANEL
TO 1945 OF FRONT (LSP)
A10
0215
1
2
3
4091
3091 560R
3092 390R
3093 560R
3094 270R
3095 3K3
2010 10n
3097 2K7
C+
C-
V+
1091 SKQNAB
1092 SKQNAB
1093 SKQNAB
6091 BAT85
6092 BAT254
3089 620R
3088 1K1
3098 75R
3099 68R
4092
V-
3096 1K5
1094 SKQNAB
PLUG&PLAY
MENU
3139 123 5287.6
CL 36532058_041.eps
030903

Personal Notes:

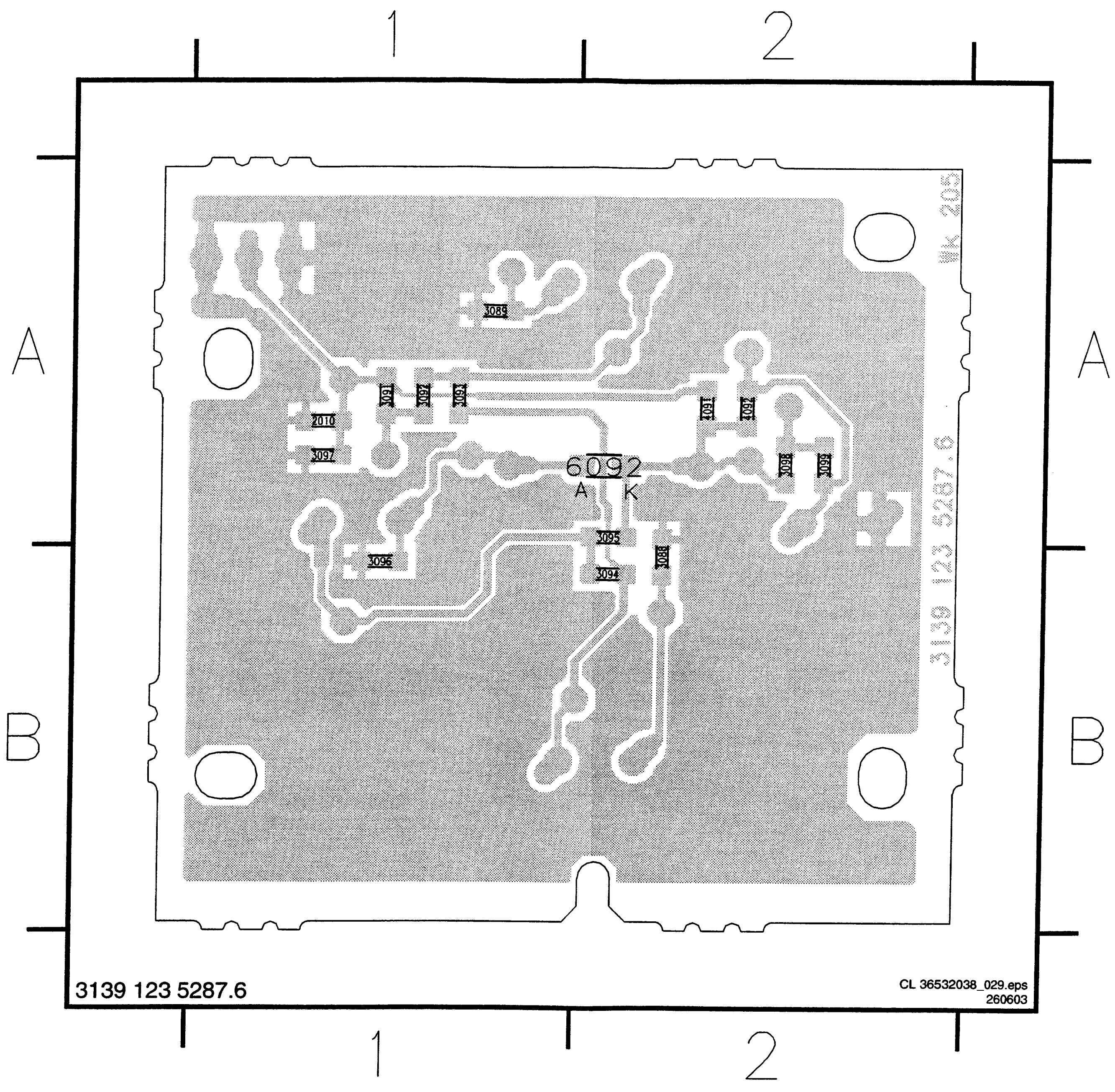
Layout Top Control Panel (Top Side)

0215	A2	1091	A1	1092	B1	1093	A2	1094	A1	6091	A1


1
2
A
B
3
1
0215
1091
1094
6091
1093
1092
3139 123 5287.6
CL 36532038_028.eps
260603

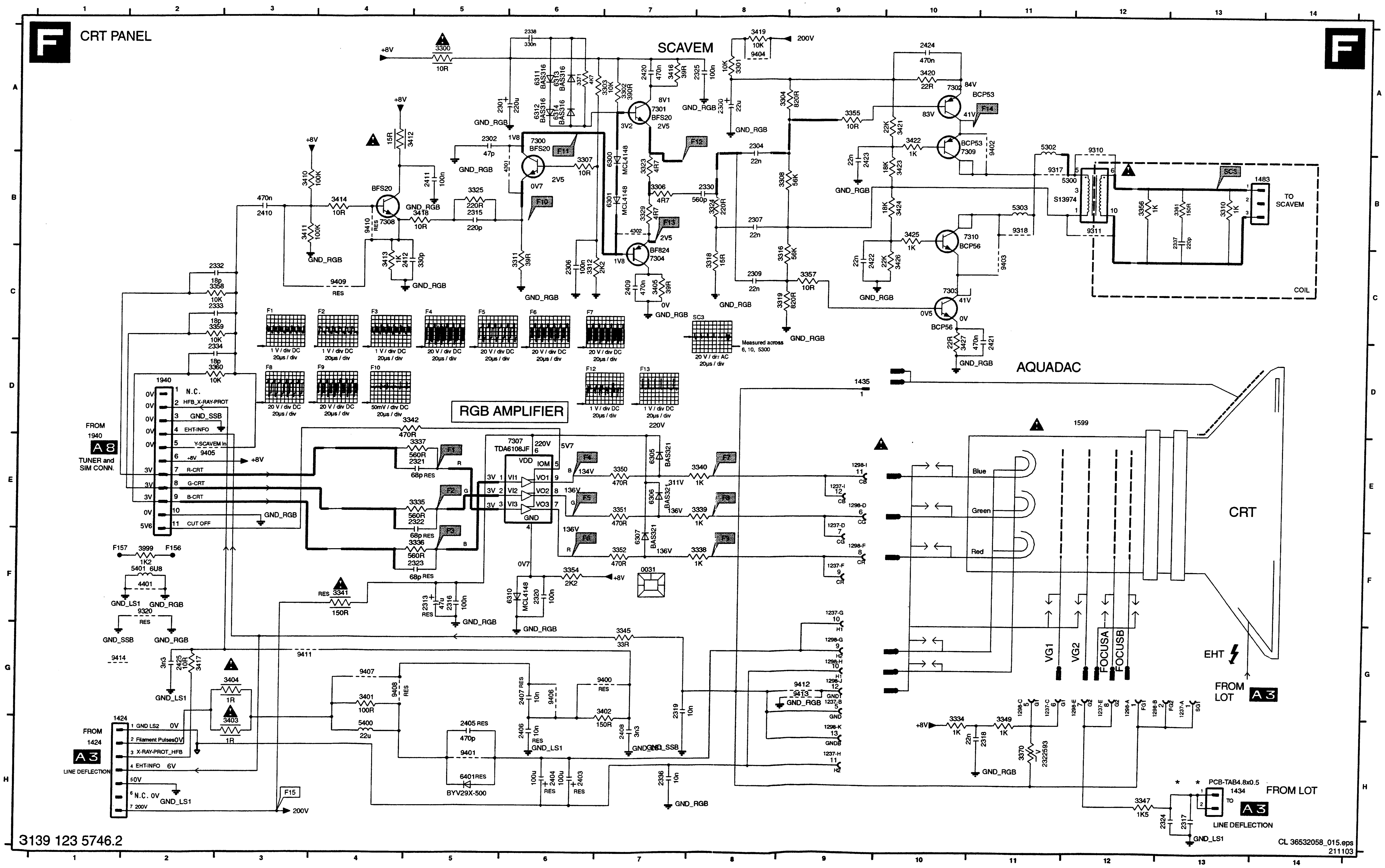
Layout Top Control Panel (Bottom Side)

2010	A1	3089	A1	3092	A1	3094	B2	3096	B1	3098	A2	4091	A2	6092	A2
3088	B2	3091	A1	3093	A1	3095	A2	3097	A1	3099	A2	4092	A2		

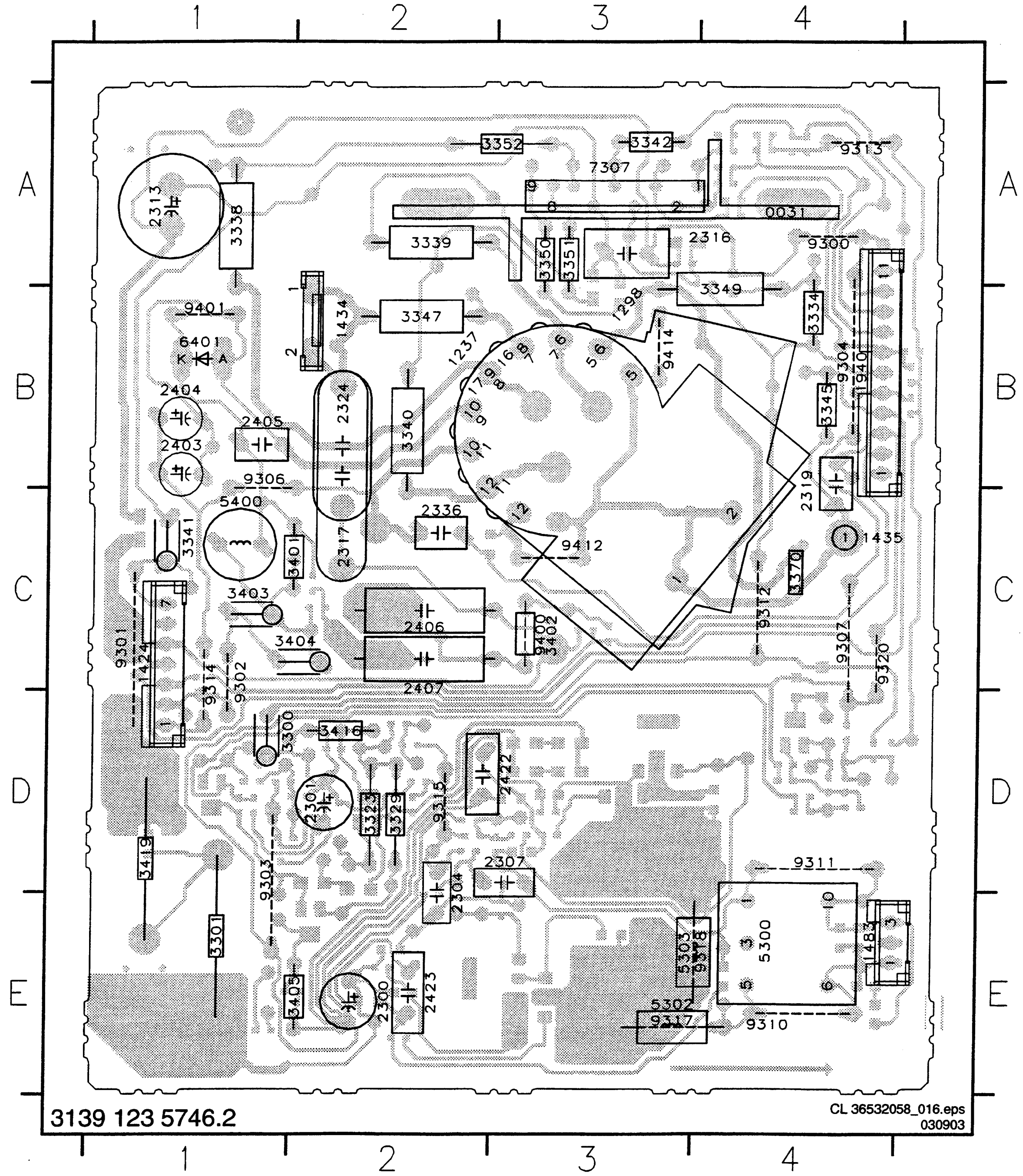

1
2
A
B
Wk 205
3089
2010
3097
3091
3092
3093
4091
4092
3098
3099
6092
A K
3096
3095
3094
3088
3139 123 5287.6
CL 36532038_029.eps
260603

CRT Panel

0031 F7	1298-B G12	1434 H13	2313 F5	2325 A8	2406 H6	2424 A10	3311 C6	3336 F5	3351 E7	3371 A6	3416 A7	3427 D10	6301 B7	7301 A7	9318 B11	9409 C4
1237-A G13	1298-C G11	1435 D9	2315 B5	2330 B8	2407 G6	2425 G2	3312 C6	3337 E5	3352 F7	3401 G4	3417 G2	3999 F2	6305 E7	7302 A10	9320 F2	9410 B4
1237-B G9	1298-D E9	1483 B13	2316 F5	2332 C2	2408 H7	3300 A5	3316 C8	3338 F8	3354 F6	3402 G7	3418 B5	4301 B5	6306 E7	7303 C10	9400 G7	9411 G3
1237-C G11	1298-E G12	1940 D2	2317 H13	2333 C2	2409 C7	3301 A8	3318 C8	3339 E8	3355 A9	3403 H3	3419 A8	4302 B7	6307 F7	7304 C7	9401 H5	9412 G9
1237-D E9	1298-F F9	2300 A8	2318 H11	2334 D2	2410 B3	3302 A7	3319 C8	3340 E8	3356 B12	3404 G3	3420 A10	4401 F2	6310 F6	7307 E6	9402 A11	9413 G9
1237-E G12	1298-G G9	2301 A5	2319 G7	2336 H7	2411 B5	3303 A7	3323 B7	3341 F4	3357 C9	3405 C7	3421 A10	5300 B11	6311 A6	7308 B4	9403 C11	9414 G1
1237-F F9	1298-H G9	2302 A5	2320 F6	2337 B13	2412 C4	3304 A8	3324 B8	3342 D5	3358 C2	3410 B3	3422 A10	5302 A11	6312 A6	7309 A10	9404 A8	
1237-G F9	1298-I E9	2304 A8	2321 E5	2338 A6	2420 A7	3306 B7	3325 B5	3345 G7	3359 C2	3411 B3	3423 B10	5303 B11	6313 A6	7310 B10	9405 E2	
1237-H H9	1298-J G9	2306 C6	2322 E5	2403 H6	2421 D11	3307 B6	3329 B7	3347 H12	3360 D2	3412 A4	3424 B10	5400 H4	6314 A6	9310 A12	9406 G6	
1237-I E9	1298-K H9	2307 B8	2323 F5	2404 H6	2422 C9	3308 B8	3334 H10	3349 H11	3361 B13	3413 C4	3425 B10	5401 F2	6401 H5	9311 B12	9407 G4	
1298-A G12	1424 H2	2309 C8	2324 H13	2405 H5	2423 B9	3310 B13	3335 E5	3350 E7	3370 H11	3414 B4	3426 C10	6300 B7	7300 A6	9317 B11	9408 G4	

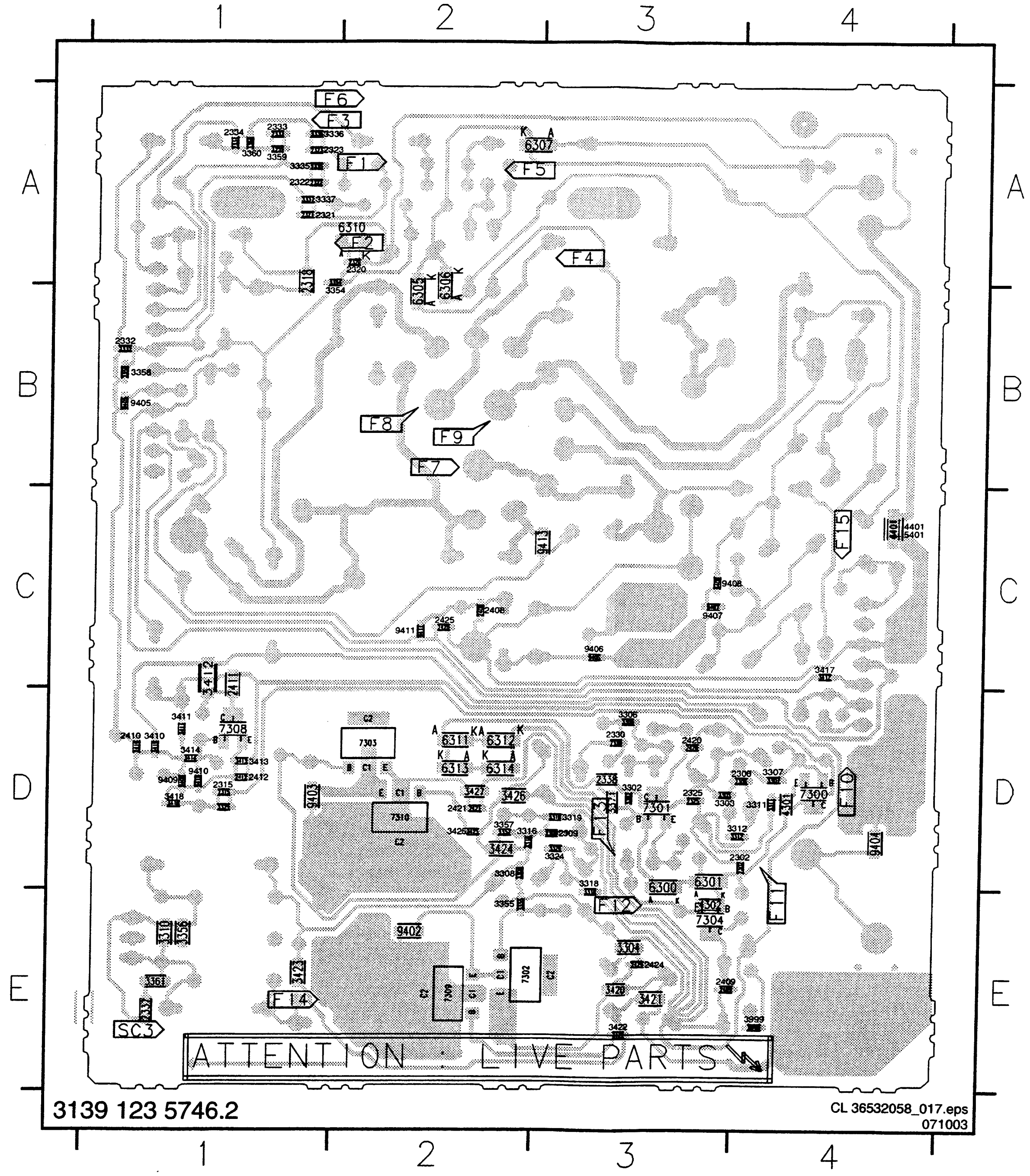

F
CRT PANEL
SCAVEM
RGB AMPLIFIER
AQUADAC
CRT
TDA6108JF
FROM 1940
A8
TUNER and SIM CONN.
FROM 1424
A3
LINE DEFLECTION
TO SCAVEM
COIL
EHT
FROM LOT
A3
PCB-TAB4.8x0.5
FROM LOT
A3
LINE DEFLECTION
VG1
VG2
FOCUSA
FOCUSB
Blue
Green
Red
+8V
200V
GND_RGB
GND_LS1
GND_SSB
3139 123 5746.2
CL 36532058_015.eps
211103

Layout CRT Panel (Top Side)


1
2
3
4
A
B
C
D
E
3352
3342
9313
7307
0031
2313
3338
3339
3350
3351
2316
9300
3349
9401
1434
3347
1298
1237
3334
6401
9414
1940
9304
3345
2404
2405
2324
3340
2403
9306
2319
5400
2336
1435
3341
3401
2317
9412
3370
3403
2406
9400
3402
9312
9307
9320
3404
9301
1424
9314
9302
2407
3300
3416
2422
2301
3323
3329
9315
3419
9303
2307
2304
9311
5303
9318
5300
1483
3301
3405
2300
2423
5302
9317
9310
3139 123 5746.2
CL 36532058_016.eps
030903

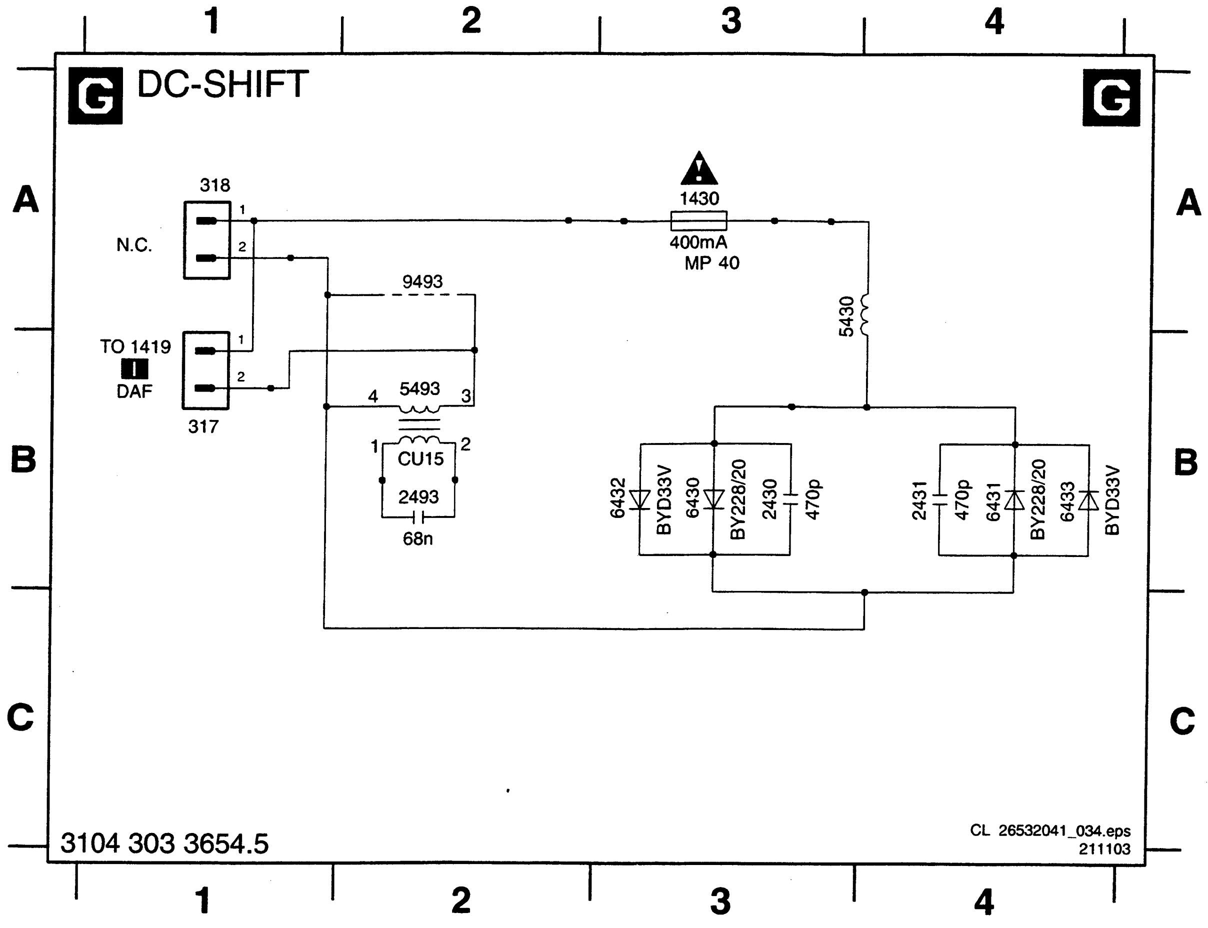
0031	A4
1237	B2
1298	B3
1424	C1
1434	B2
1435	C4
1483	E4
1940	B4
2300	E2
2301	D2
2304	E2
2307	D3
2313	A1
2316	A4
2317	C2
2319	C4
2324	B2
2336	C2
2403	B1
2404	B1
2405	B1
2406	C2
2407	C2
2422	D3
2423	E2
3300	D1
3301	E1
3323	D2
3329	D2
3334	B4
3338	A1
3339	A2
3340	B2
3341	C1
3342	A3
3345	B4
3347	B2
3349	B4
3350	A3
3351	A3
3352	A3
3370	C4
3401	C2
3402	C3
3403	C1
3404	C2
3405	E2
3416	D2
3419	D1
5300	E4
5302	E3
5303	E3
5400	C1
6401	B1
7307	A3
9300	A4
9301	C1
9302	C1
9303	D1
9304	B4
9306	B1
9307	C4
9310	E4
9311	D4
9312	C4
9313	A4
9314	C1
9315	D2
9317	E3
9318	E4
9320	C4
9400	
9401	
9412	
9414	

Layout CRT Panel (Bottom Side)


1
2
3
4
A
B
C
D
E
F6
F3
F1
F5
6307
F2
6310
F4
3313
6305
6306
2332
3358
9405
F8
F9
F7
F15
4401
5401
9413
9408
9407
2408
2425
9411
9406
3417
3412
2411
3411
7308
7303
6311
6312
6313
6314
2410
3410
3414
3413
9410
9409
2412
2315
3418
9403
3427
3426
7310
3425
3424
3308
3355
2330
2420
2338
3302
7301
2325
3303
3306
3307
7300
F10
F3
9404
3318
6300
6301
7304
F12
F11
2302
9402
3310
3356
3304
2424
3422
3420
3421
2409
3999
7309
7302
3361
2337
F14
SC3
ATTENTION : LIVE PARTS
3139 123 5746.2
CL 36532058_017.eps
071003

2302	D4
2306	D4
2309	D3
2315	D1
2318	A1
2320	A2
2321	A1
2322	A1
2323	A1
2325	D3
2330	D3
2332	B1
2333	A1
2334	A1
2337	E1
2338	D3
2408	C2
2409	E3
2410	D1
2411	C1
2412	D1
2420	D3
2421	D2
2424	E3
2425	C2
3302	D3
3303	D3
3304	E3
3306	D3
3307	D4
3308	D2
3310	E1
3311	D4
3312	D4
3316	D2
3318	E3
3319	D3
3324	D3
3325	D1
3335	A1
3336	A1
3337	A1
3354	A1
3355	E2
3356	E1
3357	D2
3358	B1
3359	A1
3360	A1
3361	E1
3371	D3
3410	D1
3411	D1
3412	C1
3413	D1
3414	D1
3417	C4
3418	D1
3420	E3
3421	E3
3422	E3
3423	E1
3424	D2
3425	D2
3426	D2
3427	D2
3999	E4
4301	D4
4302	E3
4401	C4
5401	
6300	
6301	
6305	
6306	
6307	
6310	
6311	
6312	
6313	
6314	
7300	
7301	
7302	
7303	
7304	
7308	
7309	
7310	
9402	
9403	
9404	
9405	
9406	
9407	
9408	
9409	
9410	
9411	
9413	

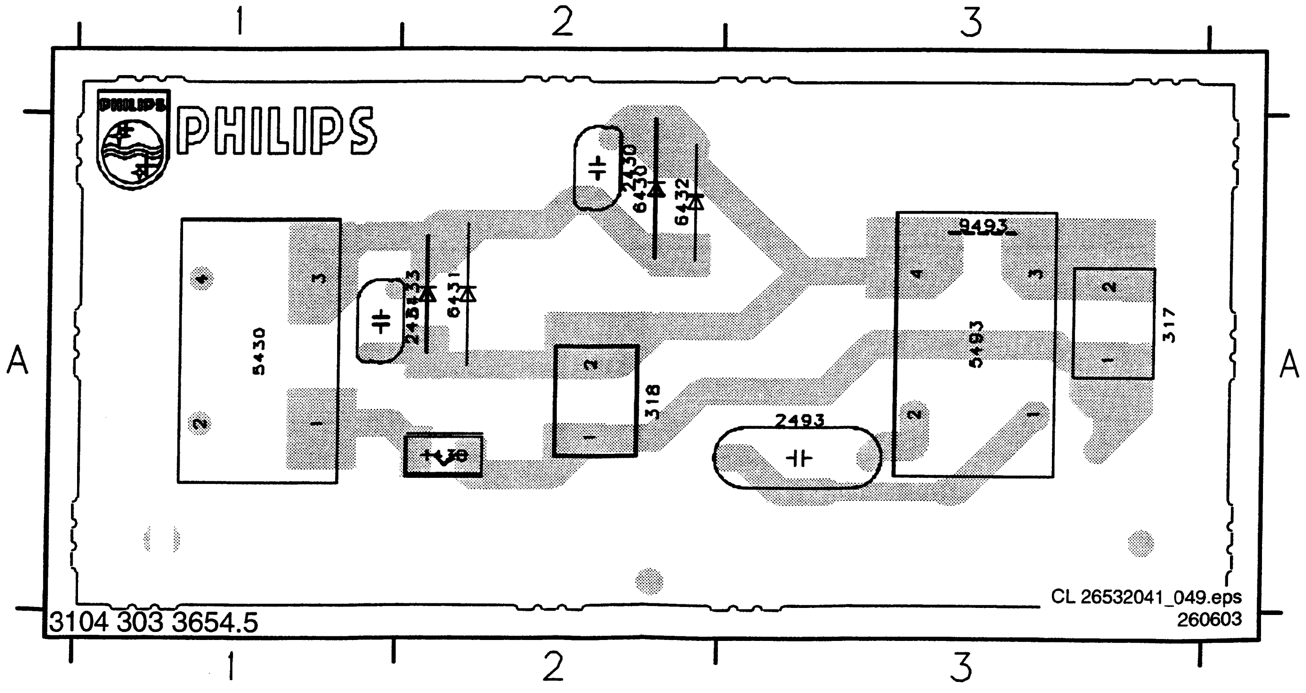
DC Shift Panel


1
2
3
4
A
B
C
G
DC-SHIFT
G
318
N.C.
1
2
1430
400mA
MP 40
9493
5430
TO 1419
I
DAF
317
1
2
4
5493
3
1
CU15
2
2493
68n
6432
BYD33V
6430
BY228/20
2430
470p
2431
470p
6431
BY228/20
6433
BYD33V
3104 303 3654.5
CL 26532041_034.eps
211103

317	B1
318	A1
1430	A3
2430	B3
2431	B4
2493	B2
5430	A3
5493	B2
6430	B3
6431	B4
6432	B3
6433	B4

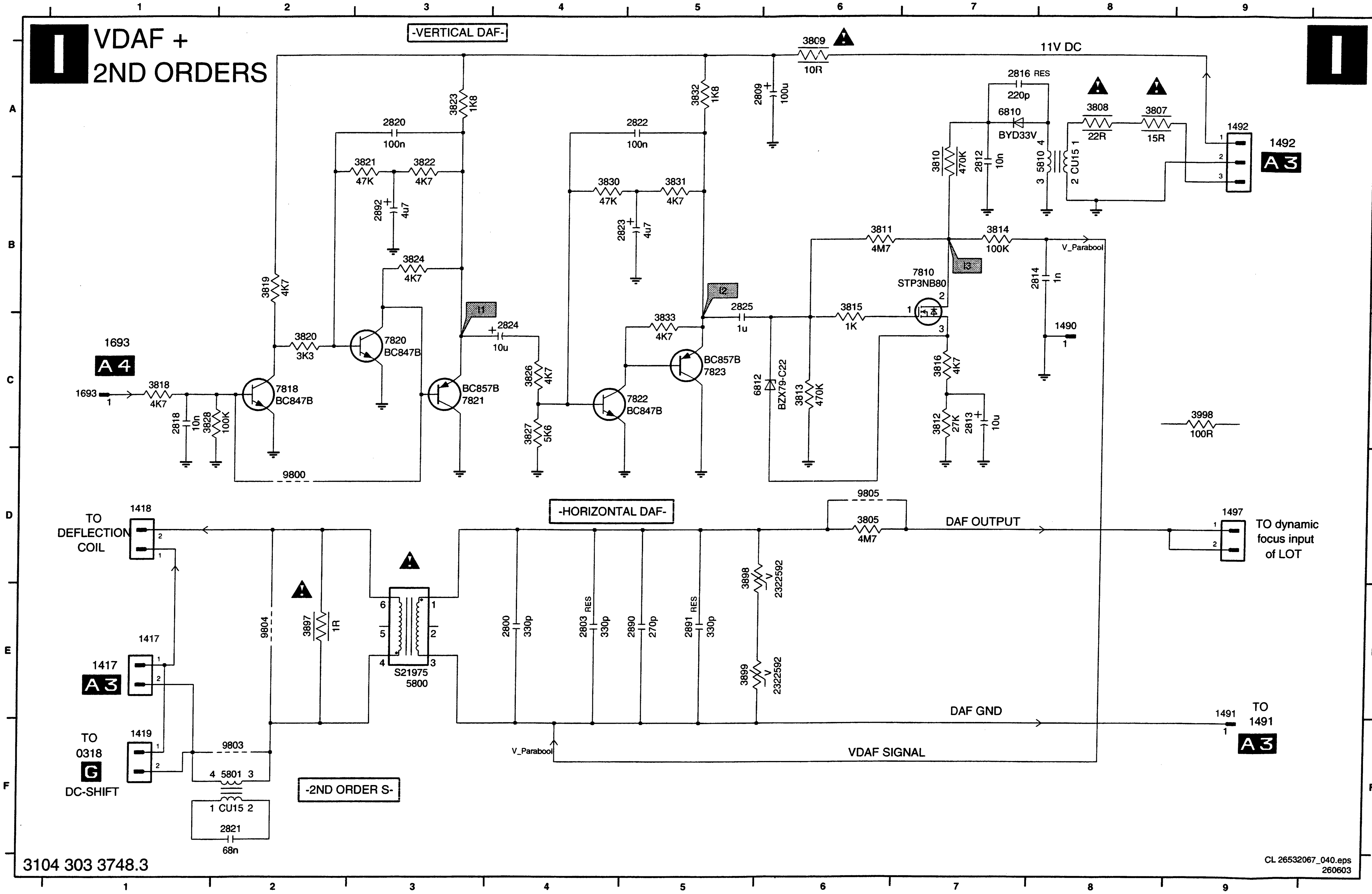
Layout DC Shift Panel

317	A3
318	A2
1430	A2
2430	A2
2431	A1
2493	A3
5430	A1
5493	A3
6430	A2
6431	A2
6432	A2
6433	A2
9493	A3


1
2
3
A
A
PHILIPS
2430
6430
6432
9493
2431
6433
6431
5430
318
5493
317
1430
2493
3104 303 3654.5
CL 26532041_049.eps
260603

Personal Notes:

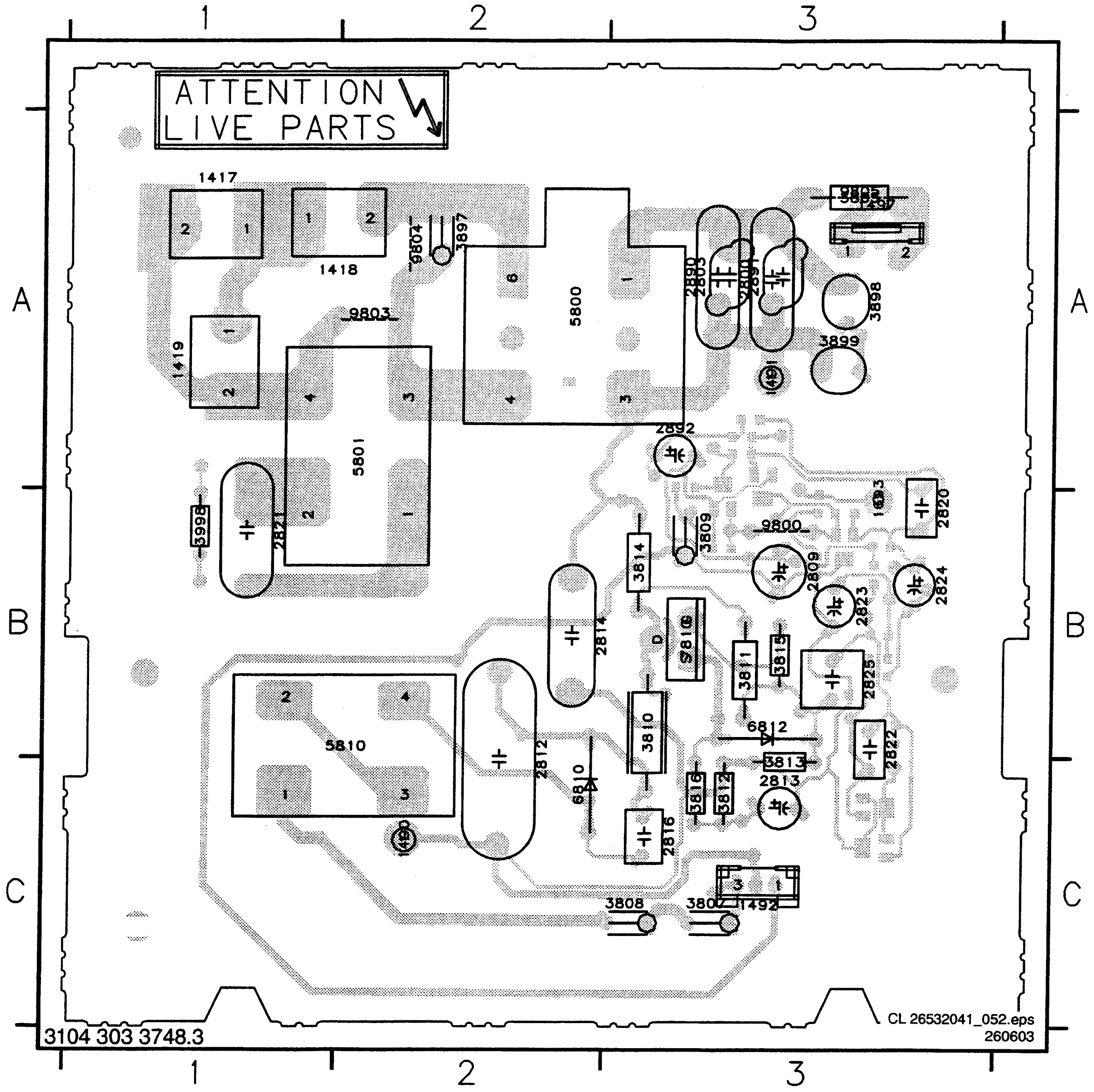
VDAF Panel + 2nd Orders


I
VDAF +
2ND ORDERS
-VERTICAL DAF-
-HORIZONTAL DAF-
-2ND ORDER S-
11V DC
DAF OUTPUT
DAF GND
VDAF SIGNAL
V_Parabool
TO DEFLECTION COIL
TO 0318
G
DC-SHIFT
TO dynamic focus input of LOT
TO 1491
A3
A4
1693
1417
1418
1419
1490
1491
1492
1497
3809 10R
2816 RES 220p
6810 BYD33V
3808 22R
3807 15R
5810 CU15
2809 100u
3823 1K8
3832 1K8
2820 100n
2822 100n
3821 47K
3822 4K7
3830 47K
3831 4K7
2892 4u7
2823 4u7
3824 4K7
3819 4K7
3820 3K3
3818 4K7
2818 10n
3828 100K
7818 BC847B
7820 BC847B
7821 BC857B
7822 BC847B
7823 BC857B
2824 10u
3826 4K7
3827 5K6
3833 4K7
2825 1u
6812 BZX79-C22
3813 470K
3815 1K
3811 4M7
3814 100K
3810 470K
2812 10n
7810 STP3NB80
3816 4K7
3812 27K
2813 10u
2814 1n
3998 100R
9800
9805
3805 4M7
9804
3897 1R
S21975 5800
2800 330p
2803 RES 330p
2890 270p
2891 RES 330p
3898 2322592
3899 2322592
9803
5801
CU15
2821 68n
I1
I2
I3
3104 303 3748.3
CL 26532067_040.eps 260603

1417 E1
1418 D1
1419 F1
1490 C8
1491 E9
1492 A9
1497 D9
1693 C1
2800 E4
2803 E4
2809 A5
2812 A7
2813 C7
2814 B8
2816 A7
2818 C1
2820 A3
2821 F2
2822 A5
2823 B4
2824 C4
2825 B5
2890 E5
2891 E5
2892 B3
3805 D6
3807 A8
3808 A8
3809 A6
3810 A7
3811 B6
3812 C7
3813 C6
3814 B7
3815 B6
3816 C7
3818 C1
3819 B2
3820 C2
3821 A3
3822 A3
3823 A3
3824 B3
3826 C4
3827 C4
3828 C1
3830 B4
3831 B5
3832 A5
3833 C5
3897 E2
3898 D5
3899 E5
3998 C9
5800 E3
5801 F2
5810 A8
6810 A7
6812 C6
7810 B7
7818 C2
7820 C3
7821 C3
7822 C5
7823 C5
9800 D2
9803 F2
9804 E2
9805 D6

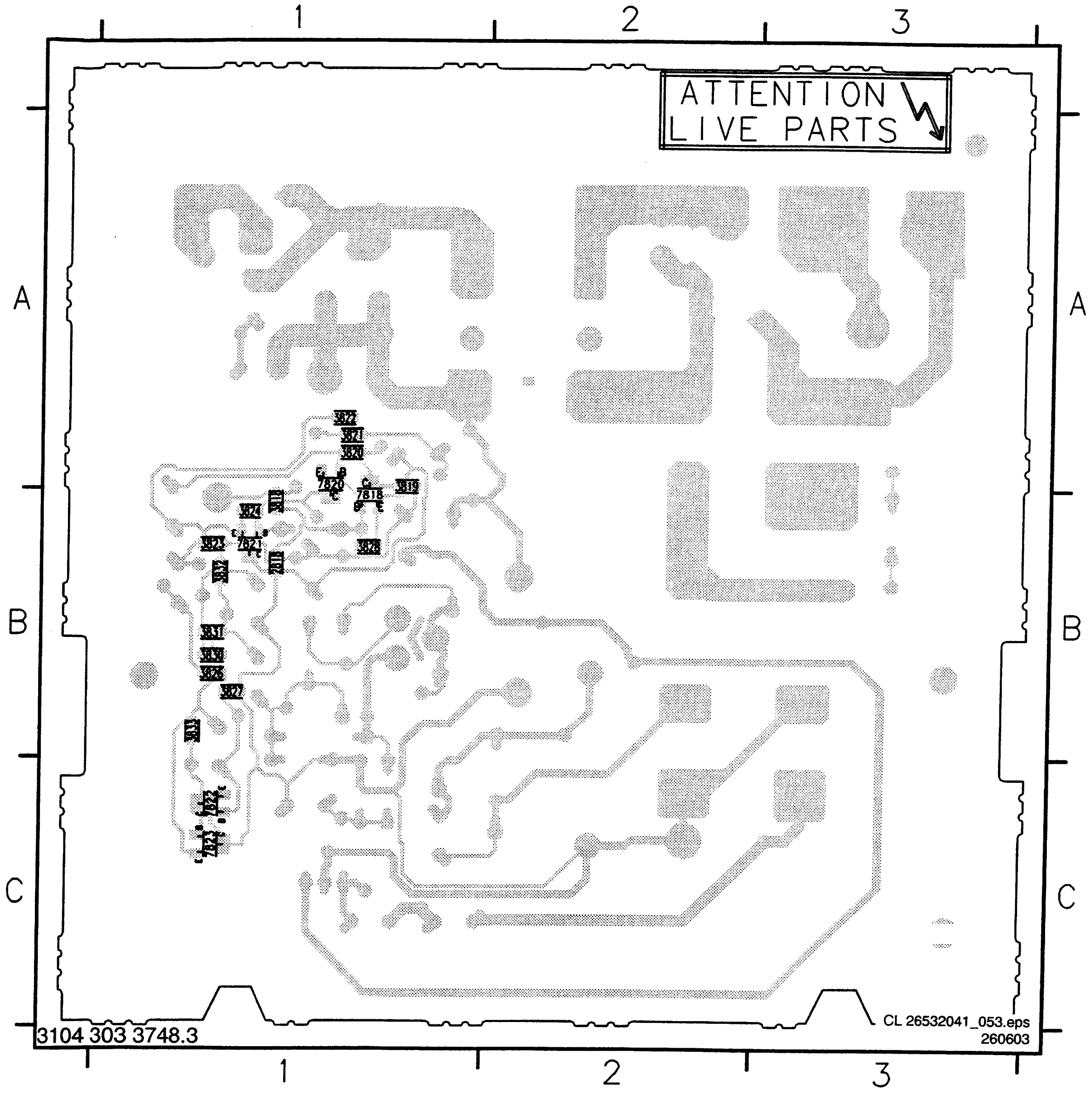
[I] VDAF+2ND ORDER S					
Item	29RF	28RF/32RF	34RF/38RF	36RF	Description
1492	X		X	X	3p
1693	X		X	X	1p
2800	X				330pF
2800		X	X		470pF
2800				X	390pF
2809	X		X	X	100□F
2812	X		X	X	10nF
2813	X		X	X	10□F
2814	X		X	X	1nF
2821	X	X			68nF
2822	X		X	X	4nF
2824	X		X	X	10□F
2825	X		X	X	1□F
2890	X				270pF
2890		X			220pF
2890			X		470pF
2890				X	390pF
3807	X		X	X	15R
3808	X		X	X	15R
3809	X		X	X	10R
3810	X		X	X	470kR
3811	X		X	X	4.7MR
3812	X		X	X	27kR
3813	X		X	X	470kR
3814	X		X	X	100kR
3815	X		X	X	1kR
3816	X		X		4.7kR
3816				X	2.2kR
3818	X		X	X	33kR
3820	X		X	X	Jumper
3821	X		X	X	Jumper
3822	X		X	X	Jumper
3823	X		X	X	1.5kR
3824	X		X	X	33kR
3826	X		X	X	3.3kR
3827	X		X	X	5.6kR
3828	X		X	X	100kR
3830	X		X	X	47kR
3831	X		X	X	4.7kR
3832	X		X	X	1.8kR
3833	X		X	X	4.7kR
5801	X	X			Transformer
5810	X		X	X	Bridge coil
6810	X		X	X	BYD33V
6812	X		X	X	BZX79-C22
7810	X		X	X	STP3NB80FP
7818	X		X	X	BC847B
7822	X		X	X	BC847B
7823	X		X	X	BC857B
9800	X		X	X	Wire
9803			X	X	Wire

Layout VDAF + 2ND Order Panel (Top Side)


1
2
3
A
B
C
ATTENTION
LIVE PARTS
1417
1418
1419
5800
5801
5810
9803
9804
3897
9805
1497
2890
2803
2891
3898
3899
1491
2892
2821
3998
3814
3809
9800
1693
2820
2809
2823
2824
2814
7810
3811
3815
2825
6812
3810
2812
6810
3813
2813
2822
3816
3812
2816
1490
3808
3807
1492
3104 303 3748.3
CL 26532041_052.eps
260603

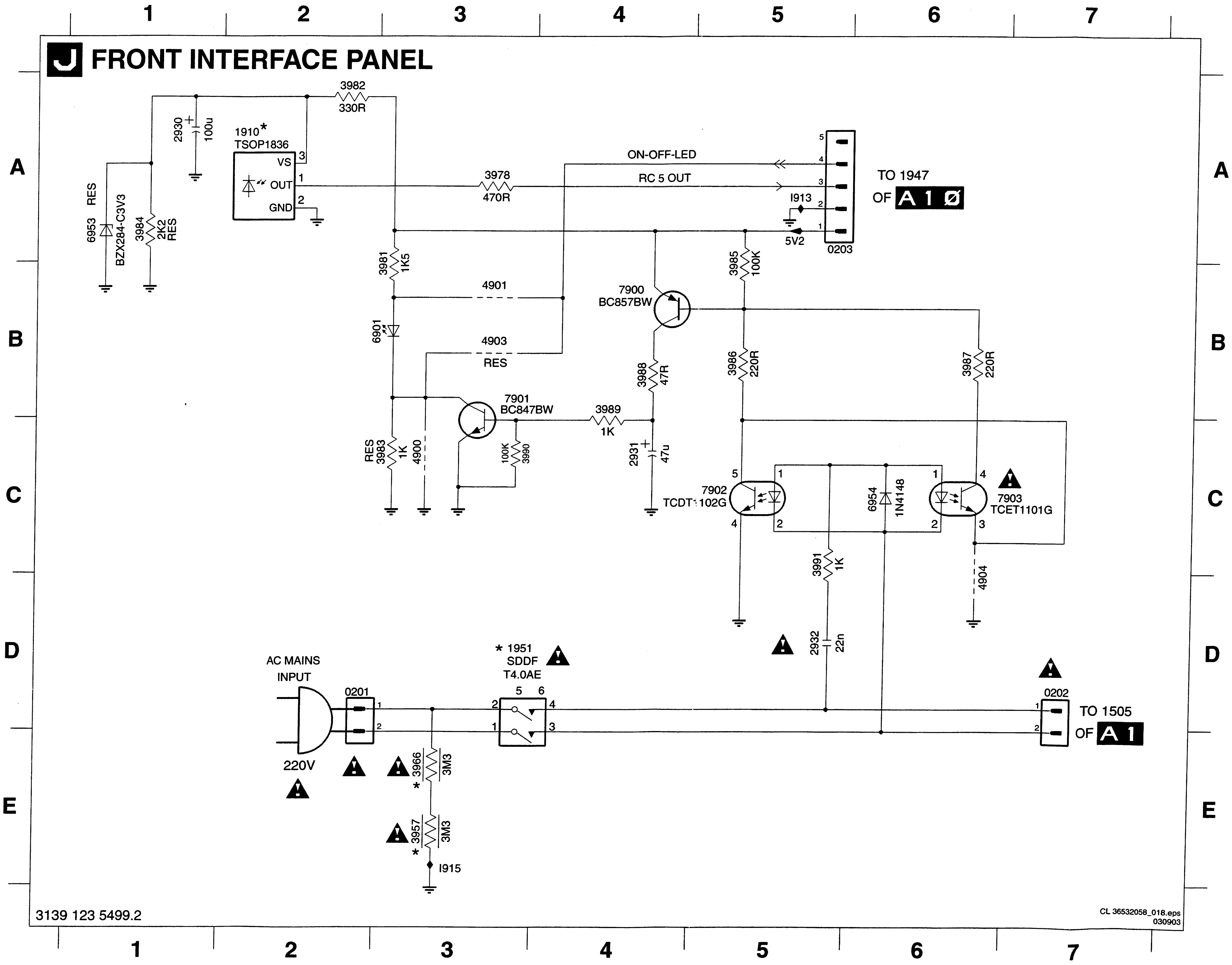
1417	A1
1418	A1
1419	A1
1490	C2
1491	A3
1492	C3
1497	A3
1693	B3
2800	A3
2803	A3
2809	B3
2812	C2
2813	C3
2814	B2
2816	C3
2820	B3
2821	B1
2822	B3
2823	B3
2824	B3
2825	B3
2890	A3
2891	A3
2892	A3
3805	A3
3807	C3
3808	C3
3809	B3
3810	B3
3811	B3
3812	C3
3813	C3
3814	B3
3815	B3
3816	C3
3897	A2
3898	A3
3899	A3
3998	B1
5800	A2
5801	A1
5810	B2
6810	C2
6812	B3
7810	B3
9800	B3
9803	A2
9804	A2
9805	A3

Layout VDAF + 2ND Order Panel (Bottom Side)


1
2
3
A
B
C
ATTENTION
LIVE PARTS
3104 303 3748.3
CL 26532041_053.eps
260603

2818	B1
3818	B1
3819	A1
3820	A1
3821	A1
3822	A1
3823	B1
3824	B1
3826	B1
3827	B1
3828	B1
3830	B1
3831	B1
3832	B1
3833	B1
7818	B1
7820	A1
7821	B1
7822	C1
7823	C1

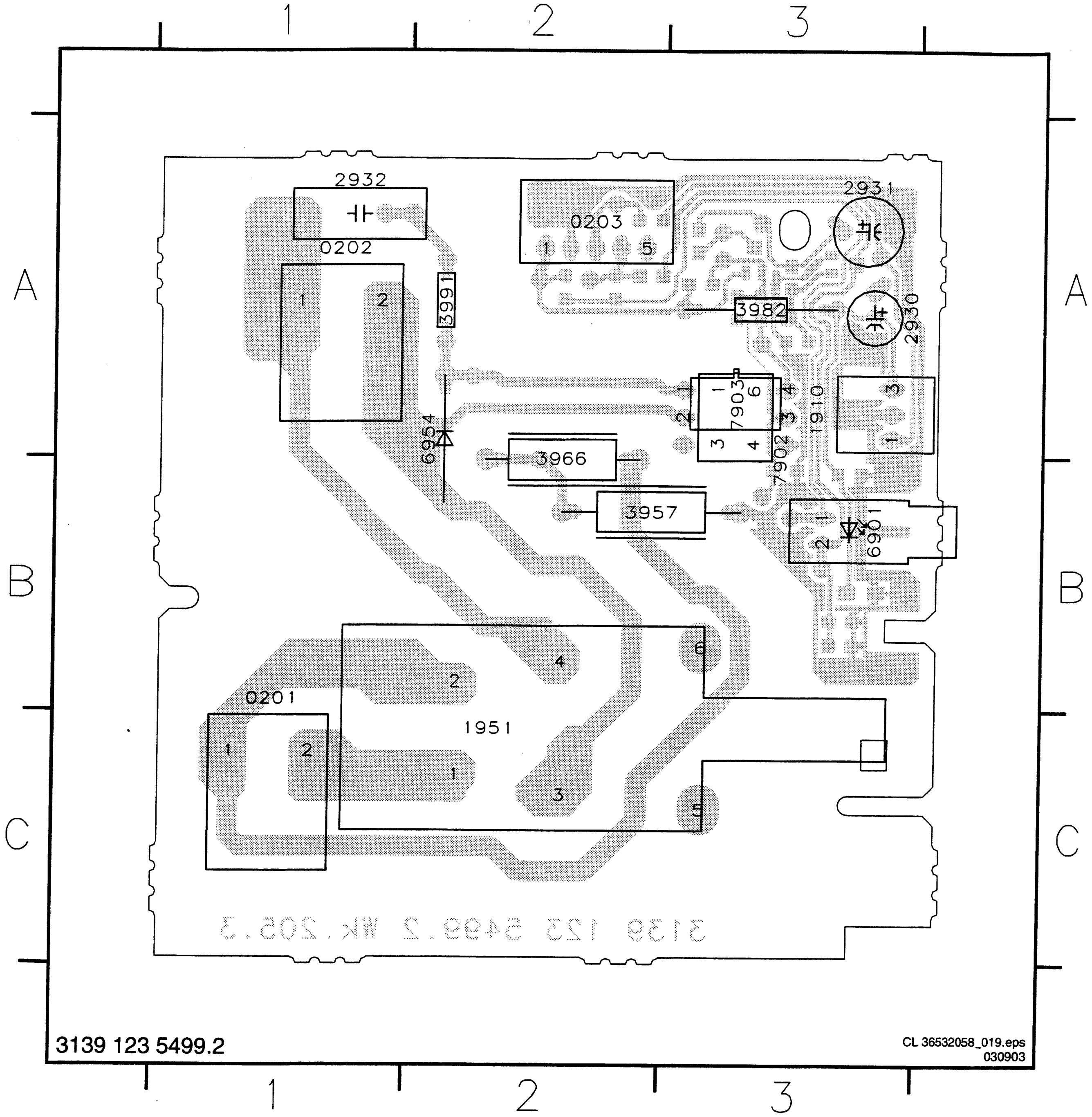
Front Interface Panel


J FRONT INTERFACE PANEL
1 2 3 4 5 6 7
A B C D E
3982
330R
2930
100u
1910*
TSOP1836
VS 3
OUT 1
GND 2
6953
RES
BZX284-C3V3
3984
2K2
RES
3978
470R
ON-OFF-LED
RC 5 OUT
I913
5V2
0203
TO 1947
OF A 1 Ø
3981
1K5
4901
6901
4903
RES
7900
BC857BW
3985
100K
3986
220R
3987
220R
3988
47R
7901
BC847BW
3989
1K
RES
3983
1K
4900
100K
3990
2931
47u
7902
TCDT1102G
6954
1N4148
7903
TCET1101G
3991
1K
4904
2932
22n
AC MAINS
INPUT
0201
220V
* 1951
SDDF
T4.0AE
5 6
3966
3M3
3957
3M3
I915
0202
TO 1505
OF A 1
3139 123 5499.2
CL 36532058_018.eps
030903

0201	D2
0202	D7
0203	A5
1910	A2
1951	D3
2930	A1
2931	C4
2932	D5
3957	E3
3966	E3
3978	A3
3981	B3
3982	A2
3983	C3
3984	A1
3985	B5
3986	B5
3987	B6
3988	B4
3989	B4
3990	C3
3991	C5
4900	C3
4901	B3
4903	B3
4904	D6
6901	B3
6953	A1
6954	C6
7900	B4
7901	B3
7902	C5
7903	C6

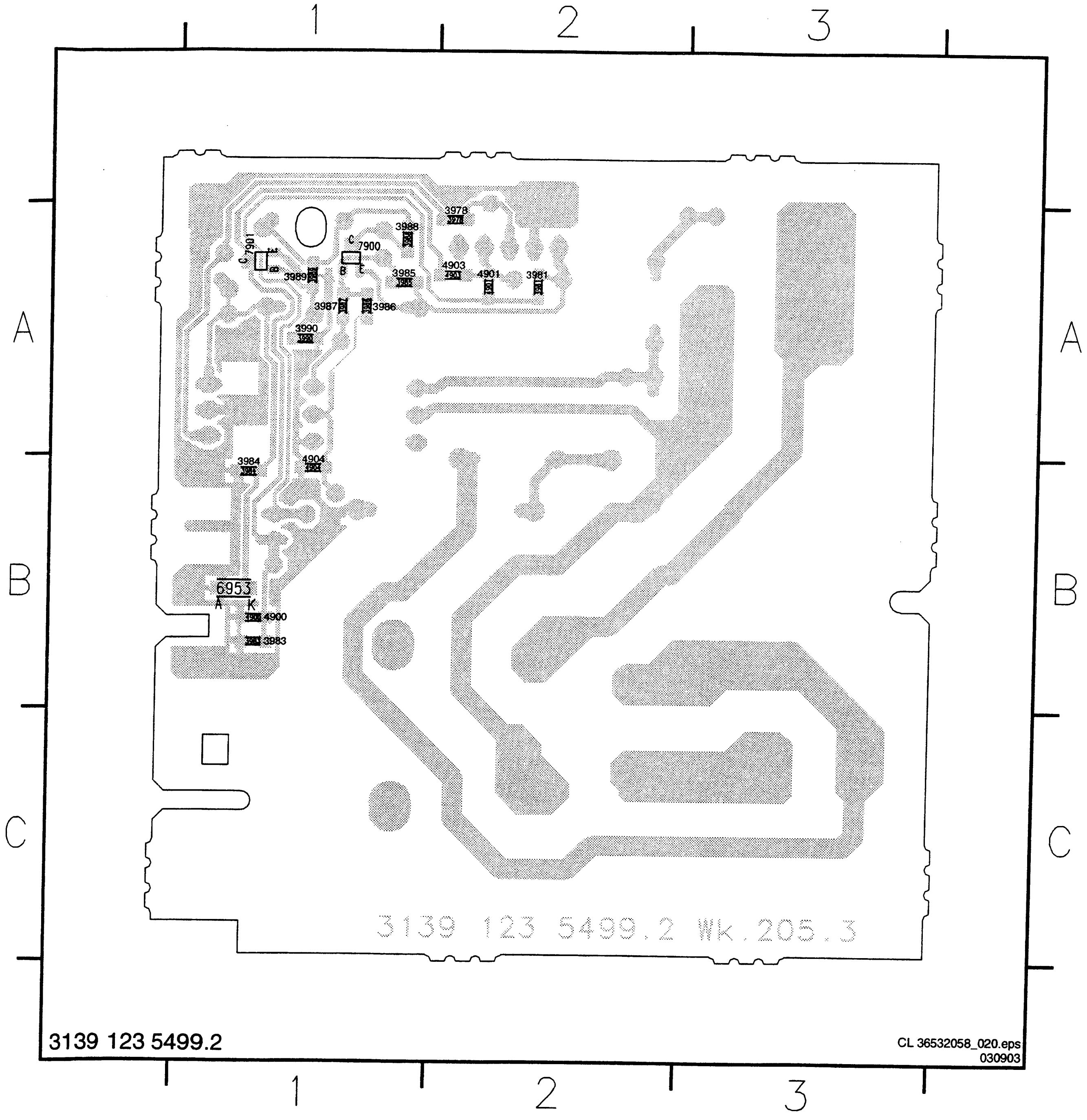
Layout Front Interface Panel (Top Side)

0201	B1
0202	A1
0203	A2
1910	A3
1951	C2
2930	A3
2931	A3
2932	A1
3957	B2
3966	B2
3982	A3
3991	A2
6901	B3
6954	A2
7902	B3
7903	A3


1
2
3
A
B
C
2932
0203
2931
0202
3991
3982
2930
7903
1910
6954
3966
7902
3957
6901
1951
0201
3139 123 5499.2 Wk.205.3
3139 123 5499.2
CL 36532058_019.eps
030903

Layout Front Interface Panel (Bottom Side)

3978	A2
3981	A2
3983	B1
3984	B1
3985	A1
3986	A1
3987	A1
3988	A1
3989	A1
3990	A1
4900	B1
4901	A2
4903	A2
4904	B1
6953	B1
7900	A1
7901	A1


1
2
3
A
B
C
7901
7900
3988
3978
3989
3985
4903
4901
3981
3987
3986
3990
3984
4904
6953
4900
3983
3139 123 5499.2 Wk.205.3
3139 123 5499.2
CL 36532058_020.eps
030903

8. Electrical Alignments

Index of this chapter:
1. General alignment conditions
2. Hardware alignments
3. Software alignments
4. Option settings

8.1 General Alignment Conditions

8.1.1 Default Alignment Settings

Perform all electrical adjustments under the following conditions:
- Power supply voltage: 230 V_ac / 50 Hz (± 10 %).
- Connect the set to the mains via an isolation transformer with low internal resistance.
- Allow the set to warm up for approximately 20 to 30 minutes.
- Measure voltages and waveforms in relation to chassis ground (with the exception of the voltages on the primary side of the power supply).
  Caution: never use heatsinks as ground.
- Test probe: Ri > 10 Mohm, Ci < 20 pF.
- Use an isolated trimmer/screwdriver to perform alignments.

Perform all electrical adjustments with the following default settings (for all CRTs):
- Choose "Natural" picture mode with the "Smart Picture" button on the remote control.
- Set "Dynamic Contrast" and "Active Control" to "off" (if either one of them is present).
- Set "Brightness" to aligned value unless otherwise specified.

8.1.2 Adjustment Sequence

Use the following adjustment sequence:
1. Set the correct TV-set OPTIONS as described in paragraph "Options". After storing, re-start the set.
2. Rough adjustment of VG2 and FOCUS.
3. RF-AGC alignment.
4. IF-PLL OFFSET adjustment.
5. Rough adjustment of GEOMETRY.
6. Allow the set to warm up.
7. Precise adjustment of VG2 and FOCUS.
8. Precise adjustment of GEOMETRY.
9. PIP alignments (if present).
10. COLOUR alignments.
11. Other software alignments.

8.2 Hardware Alignments

Notes:
- The Service Alignment Mode (SAM) is described in chapter 5 "Service Modes, Error Codes, and Fault Finding".
- Use the cursor-, menu-, and OK-buttons of the remote control (RC) transmitter for navigation.

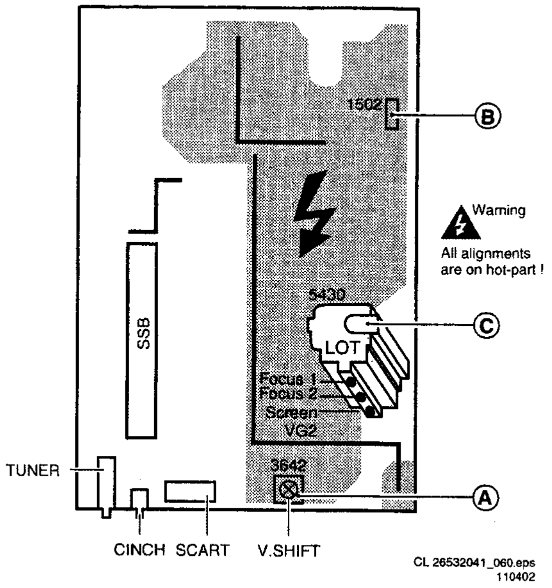


Figure 8-1 Top view LSP

8.2.1 Vg2 Adjustment

Notes:
- For adjusting the VG2 in A10 sets, the vertical scan could be disabled by the VSD bit (Vertical Scan Disable). However, do **not** use this option in this chassis, as it will lead to a "beam current" protection!
- Also, the option "VG2" in the SAM does not function yet. Please, do **not** use!

In the frame-blanking period of the R, G, and B signals applied to the CRT, the video processor inserts a measuring pulse with different DC levels. Measure the black level pulse during the vertical flyback at the RGB cathodes of the CRT.
1. Connect the RF output of a pattern generator to the antenna input. Input a "black" picture (blank screen on CRT without any OSD info) test pattern.
2. Use the MENU key to enter the "user" menu, select "Picture", and set "Brightness" and "Contrast" to minimum.
3. Set the oscilloscope to 20 V/div and the time base to 20 us/div. Use external triggering on the vertical pulse.
   Caution: use a trigger point on the "**cold**" side!
4. Ground the scope on the CRT panel ("**cold**" side) and connect a 10:1 probe to one of the cathodes of the picture tube socket (see circuit diagram F).
5. Measure at test points F017, F018 and F019 on the picture tube socket the DC-level of the measuring pulse (1st full line after the frame blanking) with respect to earth.
6. Select the pin with the highest level found and adjust V_cutoff by means of the Vg2-potmeter (lowest-one) on the Line Output Transformer (LOT) to 165 +/- 5 V_dc (for all screen sizes).
7. Reset "Contrast" and "Brightness" to their original values.

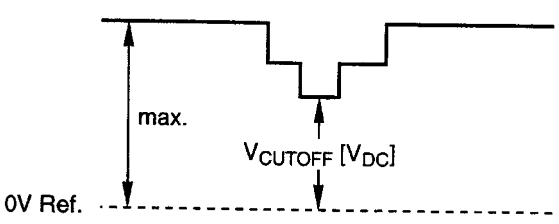


Figure 8-2 Waveform Vg2 alignment

8.2.2 Focus alignment

The LOT has the following outline:

- Focus 1 (F1) = Static alignment (black wire).
- Focus 2 (F2) = Dynamic alignment (red wire).

1. Use an external video pattern generator to input a "circle" or "crosshatch" test pattern to the set.
2. Choose "Natural" picture mode with the "Smart Picture" button on the remote control transmitter.
3. Adjust the "dynamic focus 2" potentiometer (in the middle on the LOT) until the horizontal lines at the centre of the screen are of minimum width without introducing a visible haze.
4. Adjust the "static focus 1" potentiometer (highest of the LOT) until the horizontal lines at the sides of the screen are of minimum width without introducing a visible haze.
5. Repeat these two steps to achieve the best result.

8.3 Software Alignments

Put the set in the SAM (see the "Service Modes, Error Codes and Fault Finding" section). The SAM menu will now appear on the screen. The different alignment parameters are described further on.

Notes:

- All changes to menu items and alignments must be stored manually.
- If an empty EAROM (permanent memory) is detected, all settings are set to pre-programmed default values, so the set must be re-aligned.

8.3.1 TUNER

AGC

1. Set an external pattern generator to a colour bar video signal and connect the RF output to the aerial input of the TV. Set the amplitude to 10 mV and the frequency to 475.25 MHz. Use system PAL B/G if possible, otherwise match the system of your generator with the received signal in the set.
2. Put the set in the SAM mode.
3. Select via the TUNER menu, the AGC sub-menu.
4. Connect a DC multi-meter to pin 1 of the tuner (item 1200 on the LSP).
5. Adjust the AGC until the voltage at pin 1 of the tuner is 3.3 V (+/- 0.1 V). The value can be incremented or decremented by pressing the right/left CURSOR button on the RC.
6. After alignment, save the value(s) with the STORE command in the SAM main menu.

IF PLL OFFSET

No adjustments needed: default value is "35".

If the mentioned default value does not give the required result, use the following alignment method:

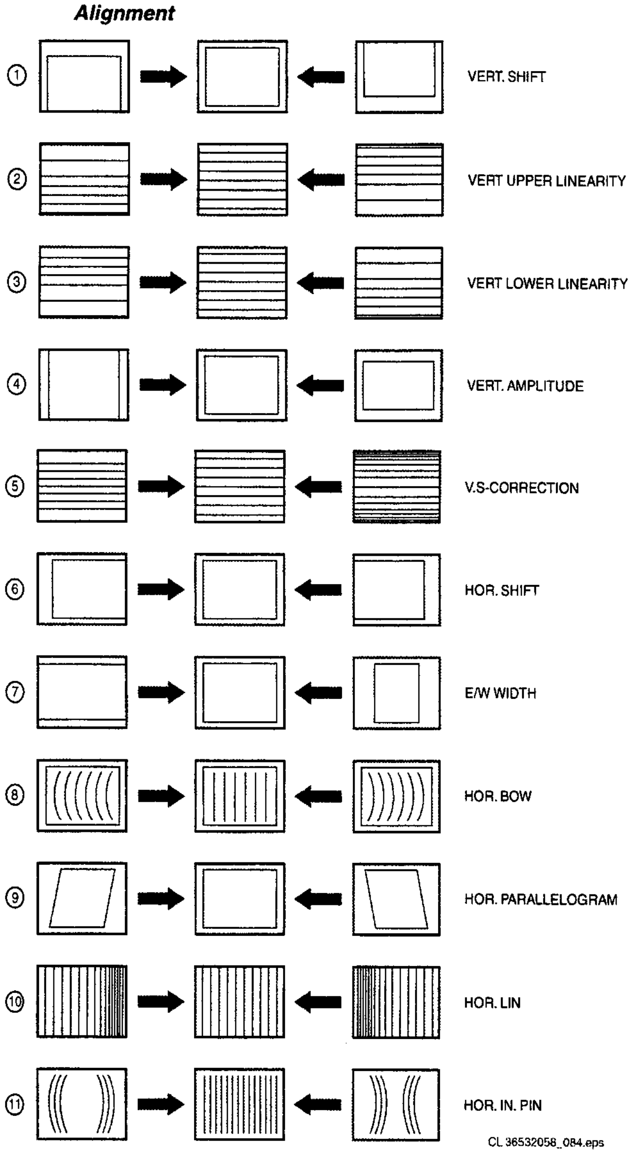
1. Set an external pattern generator to a crosshatch video signal and connect the RF output to the aerial input of the TV. Set the amplitude to 10 mV and the frequency to 475.25 MHz. Use system PAL B/G if possible, otherwise match the system of your generator with the received signal in the set.
   - For "Negative modulation", the **sound** signal must be a non-modulated FM signal.
   - For "Positive modulation", the **video** signal must have high modulation (100% or above).
2. Put the set in the SAM mode.
3. Select via the TUNER menu, the IF-PLL OFFSET sub-menu.
4. Measure and align:
   - For "Negative modulation", on SCART pin 1 or 3 (**audio** out): Adjust IF-PLL OFFSET until the largest Signal Noise Ratio (SNR) is reached.
   - For "Positive modulation", on SCART pin 19 (**video** out): Adjust IF-PLL OFFSET until you get minimal V-sync disturbance.

8.3.2 GEOMETRY

Notes:

- Set an **external** pattern generator to a crosshatch video signal and connect the RF output to the aerial input of the TV. Set the amplitude at least 1 mV_rms (60 dBuV) and the frequency to 475.25 MHz. Use system PAL B/G if possible, otherwise match the system of your generator with the received signal in the set.
  Note: Do **not** use the internal test pattern from the GEOMETRY menu!
- Use the default alignment settings, but set "Brightness" to "32".
- For wide screen models, set to "wide screen" mode, for "classic" models, set to "4:3".
- After alignment, save the value(s) with the STORE command in the SAM main menu.

Service tip: When the set is equipped with a rotation coil, use this menu item to check its correct alignment. If alignment is not correct, go to the user MENU, choose FEATURES, and select ROTATION. With the use of a crosshatch test pattern, align it to a correct horizontal picture.



CL 36532058_084.eps
211103

Figure 8-3 Geometry Alignments

1. Before starting the vertical alignment, set (in SAM) the following parameters to "0":
   - VER. SHIFT,
   - VER. SCOR,
   - VER. U_LIN,
   - VER. L_LIN.
2. Set SERV. BLK to "on", to blank the lower half of the screen.
3. Adjust the "VERTICAL SHIFT" potentiometer (R3642 on the LSP) until the picture is centred (to the mechanical centre of the picture tube), and switch SERV. BLK to "off".
4. Adjust VER. U_LIN and VER. L_LIN such, that upper and lower horizontal lines of the crosshatch pattern are just visible.

Use then the following software regulations to modify the geometry:

1. VER. AMPL (Vertical Amplitude): Align for the vertical picture centre, range from -32 to +32.
2. VER. SHIFT (Vertical Shift): Compensating for any gain error in amplifier, adjust range from -32 to +32 to the proper amplitude.
3. VER. SCOR (Vertical S-Correction): Align for equal height of the blocks in the top, the bottom and the middle, range from -63 to +63.
4. HOR. SHIFT (Horizontal Shift): Adjust for the horizontal centre of the screen, range from -127 to +128.

Next step is to align the East/West geometry.

1. First, set the parameters EW_5 and EW_6 to "0"
2. EW. WIDTH (East-West Width): This sets the (overall) horizontal size of the picture on the screen. Range from -63 to +63 (with the following EW alignments, these lines can be straightened).
3. EW_1 (East-West parameter 1): Has effect on the length of the upper part of the vertical E/W lines.
4. EW_2 (East-West parameter 2): Has effect on the length of the vertical E/W lines just below EW_1.
5. EW_3 (East-West parameter 3): Has effect on the length of the vertical E/W lines just below EW_2.
6. EW_4 (East-West parameter 4): Has effect on the length of the vertical E/W lines just below EW_3.
7. EW_5 (East-West parameter 5): Has effect on the length of the vertical E/W lines just below EW_4.
8. EW_6 (East-West parameter 6): Has effect on the length of the vertical E/W lines just below EW_5.
9. EW_7 (East-West parameter 7): Has effect on the length of the vertical E/W lines just below EW_6.
10. EW_8 (East-West parameter 8): Has effect on the length of the vertical E/W lines just below EW_7.
11. EW_9 (East-West parameter 9): Has effect on the length of the vertical E/W lines just below EW_8.
12. EW_10 (East-West parameters 10): Has effect on the length of the lowest part of the vertical E/W lines.
13. HOR. BOW (Horizontal Bow): Align the EW parabola to be symmetrical, range from -63 to +63.
14. HOR. PARALLEL (Horizontal Parallel): Align for straight vertical lines on the picture sides, range from -63 to +63.
15. HOR. LIN (Horizontal Linearity): Align for equal width of horizontal blocks on the left, the right and the centre, range from 0 to +127.
16. HOR. IN_PIN (Horizontal Inner Pincushion): Align for the inner straight vertical lines, range from 0 to +32.

8.3.3 WHITE TONE

In the WHITE TONE sub menu, the colour values for the different colour temperatures can be changed.
The colour temperature mode (NORMAL, DELTA COOL, DELTA WARM) can be selected per colour (R, G, and B) with the RIGHT/LEFT cursor keys. The mode or value can be changed with the UP/DOWN cursor keys.
First, the values for the NORMAL colour temperature must be selected. Then the offset values for the DELTA COOL and DELTA WARM mode can be selected. Note that the alignment values are non-linear.

Alignment

No adjustments needed. Use the given default values:

Table 8-1 White tone alignment (default values)

Parameter	28PW8609/12	29PT8509/12	32PW8609/12
Normal Red	-4	+11	+1
Normal Green	-9	+4	-7
Normal Blue	-6	+12	-2
Red BL Offset	7		
Green BL Offset	7		
Blue BL Offset	7		
Delta Cool Red	7		
Delta Cool Green	15		
Delta Cool Blue	33		
Delta Warm Red	2		
Delta Warm Green	3		
Delta Warm Blue	7		

If the mentioned default value does not give the required result, use the following alignment method:

1. Set the external pattern generator to a 100% white pattern, and connect the RF output to the aerial input of the TV. Set the amplitude at least 1 mV_rms (60 dBuV) and the frequency to 475.25 MHz. Use system PAL B/G if possible, otherwise match the system of your generator with the received signal in the set.
2. Set "Smart Picture" to "Natural".
3. Set "Dynamic NR" to "off".
4. Put the set in the SAM mode.
5. Select via the WHITE TONE menu, the PATTERN sub-menu.
6. Set PATTERN to "on".
7. Set NORMAL GREEN to "32".
8. Measure with the colour analyser (Minolta CA100 Colour Analyser or equivalent), calibrated with the spectra, on the centre of the screen.
9. Adjust with the cursor left/right command the Red and Blue register for the right xy-coordinates (see the table below).
10. Repeat the white tone adjustment also for the colour temperatures COOL and WARM.

Table 8-2 White tone alignment (with colour analyser)

White D mode	Temperature	DUV	x	y
Normal	8500 K	+-0.004	288 +/- 4	300 +/- 4
Cool	11500 K	+-0.005	273 +/- 5	282 +/- 5
Warm	7000 K	+-0.005	305 +/- 5	312 +/- 5

8.3.4 SOUND

No adjustments needed. Use the given default values:

- PRESCALE LEVEL
  - FM: "+1".
  - NICAM: "+3".
  - EXTAM Gain: "0".
  - PIPMONO: "0".
  - ExtLR-in: "0".
- TRESHOLD LEVEL
  - Over Mod Tresh: "+3dB".
  - NIC ErrLmt_Hi: "60".
  - NIC ErrLmt_Lo: "20".
  - NoiseTres SC2: "+2".
  - NoiseHyst SC2: "+4".
- EFFECTS LEVEL
  - BMT CutOffFrq: "50Hz".
  - Incredible SND: "60%".
  - VDolby: "100%".

8.3.5 SMART SETTINGS

No adjustments needed. Use the given default values:

Table 8-3 Smart settings (default values)

Smart setting		Default
RICH	BGT	55
	COL	55
	CON	100
	SHP	6
	HUE	51
NATURE	BGT	51
	COL	48
	CON	80
	SHP	5
	HUE	51
SOFT	BGT	49
	COL	45
	CON	65
	SHP	4
	HUE	51
MULTI	BGT	51
	COL	48
	CON	85
	SHP	6
	HUE	51
BGT= Brightness, COL= Colour, CON= Contrast, SHP= Sharpness, HUE= Hue (not valid for Europe).		

8.4 Option Settings

8.4.1 Introduction

The microprocessor communicates with a large number of I2C ICs in the set. To ensure good communication and to make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence / absence of these specific ICs (or functions) is made known by the option codes.

Notes:

- After changing the option(s), save them with the STORE command.
- All changes are disregarded when the OPTIONS submenu is left without using the STORE command.
- The new option setting is only active after the TV is switched "off" and "on" again with the Mains switch (the EAROM is then read again).

8.4.2 Changing options

Options are used to control the presence / absence of certain features and hardware. There are two ways to change the option settings. All changes in the option settings are saved by selecting STORE and pressing the CURSOR RIGHT key. Some changes will only take affect after the set has been switched OFF and ON with the mains switch (cold start).

Changing multiple options by changing option byte values

Option Bytes (OB) makes it possible to set all options very fast. An option byte represents a number of different options. All options are controlled via eight option bytes (OB0 to OB7). Select an Option Byte you want to change with the CURSOR UP/DOWN keys, and key in the new value. See table for more details. An explanation per option is listed in paragraph "Option Bit Definition".

Changing a single option

It is also possible to change an option one at a time. Therefore, select the option with the CURSOR UP/DOWN keys and change its setting with the LEFT/RIGHT keys.

8.4.3 Option Settings

In the table, you will find the option settings.

Table 8-4 Option bit overview

Byte number	Bit number	Decimal value	Name	28PW8609/12	29PT8509/12	32PW8609/12
OB1	1	2	SCAVM	1	1	1
	5	32	RCMX	0	0	0
	6	64	EQTO	0	0	0
	8	256	WSSB	1	0	1
	12	4096	DGSC	1	1	1
	14	16384	SSHT	1	0	1
OB2	5	32	DBYV	1	1	1
	9	512	P50	0	0	0
	11	2048	QPEAK	0	0	0
	12	4096	EPG	0	0	0
OB3	0	1	AV3	1	1	1
	1	2	SCT3	0	0	0
	5	32	SOSD	0	0	0
	8	256	ASPR	1	0	1
	9	512	ROTI	1	0	1
OB4	3	8	PITN *	0	0	0
	4	16	PITN *	0	0	0
OB5	6	64	AAVL	1	1	1
OB8	4	16	PIPC	0	0	0
	5	32	PIPT	0	0	0
OB9	0	1	APC	1	1	1
	5	32	VMOD	0	0	0
	7	128	TIME	1	1	1
	8	256	DNR	1	1	1
	9	512	BBD	0	0	0
	10	1024	ASF	0	0	0
OB10	5	32	UKPNP	0	0	0
	6	64	DTXT	1	0	1
	8	256	SBNP	1	1	1
	9	512	AUSB	0	0	0
	10	1024	CZOM	1	0	1
	11	2048	HSHT	1	0	1
	14	16384	CHLK	1	1	1
OB11	9	512	T1H0	1	1	1
	13	8192	FAPG	1	1	1
	14	16384	ACI	1	1	1
OB12	8	256	PLST	1	1	1
OB13	0	1	T2H5	1	1	1
	2	4	T12H	1	1	1
	3	8	EWEU	0	0	0
	7	128	SMCK	1	1	1
	8	256	ATS	1	1	1
* = There are 2 bits for this option: 00 = Philips, 01 = Other						
Unused options have a default value of "0"						

8.4.4 Option Bit Definition

Sources

AV3: Side AV source.
Function: Disable/Enable side AV source.
Values: OFF= Disabled, side AV source is not available. ON= Enabled, side AV source is available.

SCT3: SCART 3 input.
Function: Disable/Enable Scart3 input.
Values: OFF= Disabled. ON= Enabled.

Video

ASPR: Aspect Ratio Setting.
Function: Select between 4 by 3 or 16 by 9 set.
Values: OFF= 4 by 3 set. ON= 16 by 9 set.

DNR: Dynamic Noise Reduction.
Function: Disable/Enable (Dynamic) Noise Reduction function.
Values: OFF=Disabled. ON= Enabled.

BBD: Black Bar Detection.
Function: Disable/Enable Black Bar Detection.
Values: OFF=Disabled, Black Bar Detection not available. ON= Enabled, Black Bar Detection available.
Note: The Auto Screen Fit will not be included in the picture size loop when BBD is OFF.

ASF: Auto Screen Fit.
Function: Disable/Enable Auto Screen Fit.
Values: OFF=Disabled, Auto Screen Fit is not available. ON= Enabled, Auto Screen is Fit available.

CZOM: Continuous Zoom.
Function: Disable/Enable Continuous Zoom.
Values: OFF=Disabled. ON= Enabled.

HSHT: Heading Shift.
Function: Disable/Enable Heading Shift.
Values: OFF=Disabled. ON= Enabled.

SSHT: Subtitle Shift.
Function: Disable/Enable Subtitle Shift.
Values: OFF=Disabled. ON= Enabled.

APC: Auto Picture Control (Auto TV).
Function: Disable/Enable Auto picture control.
Values: OFF= Disabled. ON= Enabled.

WSSB: Wide Screen Signalling Bit.
Function: Disable/Enable Wide screen Signalling bit function.
Values: OFF= Disabled. ON= Enabled.

ROTI: Rotation Tilt.
Function: Change the tilt level of picture tube.
Values: OFF= Disabled, menu item ROTATION is not available. ON= Enabled, menu item ROTATION is available.

DGSC: Digital Scan.
Function: Enable/Disable the Digital Scan in the DIGITAL OPT menu.
Values: OFF= Disabled, menu item DIG SCAN is not available. ON= Enabled, menu item DIG SCAN is available.

SCAVM: SCAVEM.
Function: Enable/Disable SCAVEM.
Values: OFF= Disabled. ON= Enabled.

Audio

AAVL: Automatic Volume Level control.
Function: Disable/Enable automatic volume leveller function.
Values: OFF=Disabled, menu item AVL is not available. ON= Enabled, menu item AVL is available.

DBYV: Dolby Virtual.
Function: Select surround setting.
Values: OFF= Disabled, DOLBY VIRTUAL setting is not available. ON= Enabled, DOLBY VIRTUAL setting is available.
Note: Incredible surround & Dolby virtual are mutually exclusive.

EQTO: Equalizer or Tone control.
Function: Selection between Equalizer and Tone control (Bass and Treble).
Values: OFF= Tone control (Bass and Treble). ON= Equalizer.
Note: Equalizer and Tone (Bass and treble) control are mutually exclusive.

QPEAK: AV Sound Mode detection.
Function: The current Sound Mode detection in AV is not working correctly. The optimal threshold value for the correct sound mode detection is still being investigated. Therefore, this is needed to disable the Sound Mode detection in AV until the correct threshold is identified.
Value: OFF= Disabled, AV sound auto detection is not available. ON= Enabled. AV sound auto detection is available.

Tuning
PITN: Philips Tuner.
Function: Choose the tuner type that is configured in the hardware.
Values: OFF= Disabled, ALPS compatible tuner is used. ON= Enabled, Philips compatible tuner is used.

Installation
ACI: Automatic Channel Installation.
Function: Disable/Enable automatic channel installation.
Values: OFF= Disabled Automatic Channel Installation. ON= Enabled Automatic Channel Installation.
Note: Download present program when ACI is ON.

ATS: Automatic Tuning System.
Function: Disable/Enable automatic tuning system.
Values: OFF= Disabled, automatic tuning system is ignored. ON= Enabled Automatic Tuning System, sort the program in an ascending order starting from Program 1.
Note: Sort the program in an ascending order starting from Program 1 when ATS is ON.

VMOD: Virgin Mode.
Function: Disable/Enable virgin mode.
Values: OFF= Disabled, cannot access virgin mode. ON= Enabled, can access virgin mode.
Note: Plug and Play menu item will be displayed to perform installation at the initial start up of the TV when MOD is ON and after installation is done, VMOD will be automatically set to OFF.

UKPNP: UK Plug and Play.
Function: Disable/Enable UK's default Plug and Play setting.
Values: OFF= Disabled, UK's default Plug and Play setting is not available. ON= Enabled, UK's default Plug and Play setting is available.
Note: When UKPNP and VMOD are ON at the initial set-up, LANGUAGE= ENGLISH, COUNTRY= GREAT BRITAIN and after auto store is complete, VMOD will be set automatically to OFF while UKPNP remain ON.

Program Selection
PLST: Program List.
Function: Disable/Enable Program List function.
Values: OFF= Disabled, the access to Program List Command is ignored. ON= Enabled, the access to Program List Command is processed.

Picture In Picture
PIPC: PIP Control.
Function: Disable/Enable submenu to adjust PIP Picture settings
Values: OFF= Disabled, PIP feature is not available. ON= Enabled, PIP feature is available
Note: PIP is present in FEATURES submenu when PIPC is ON. When PIPC is switched OFF, bits PIPT, W4X3, and W169 must be automatically set to OFF.

PIPT: PIP Tuner.
Function: To determine the presence of second tuner.
Values: OFF= Disabled, second tuner is not available. ON= Enabled, second tuner is available.
Note: When PIPC is switched OFF, bits PIPT, W4X3, and W169 must be automatically set to OFF.

Clock
SMCK: Smart Clock/Autochron.
Function: Disable/Enable smart clock/AutoChron function.
Values: OFF= Disabled, menu item smart clock function not available. ON= Enabled, menu item smart clock function available.
Note: For NAFTA, AUTOCHRON is present in INSTALL submenu when SMCK is ON. For AP-PAL and EUROPE, Smart clock downloaded from Teletext is enabled when SMCK is ON.

TIME: Timer.
Function: Disable/Enable menu item TIMER.
Values: OFF= Disabled, menu item TIMER not available. ON= Enabled, menu item TIMER available.
Note: TIMER submenu is present in FEATURES submenu when TIME is ON.

Data Service
DTXT: Dual Text.
Function: Disable/Enable Dual Text.
Values: OFF= Disabled. Dual text is not available. ON= Enabled. Dual text is available.

RCMX: RC for Teletext Mix Mode.
Function: Disable/Enable RC for Teletext Mix mode support.
Values: OFF= Disabled. RC for mix mode is not available. ON= Enabled, RC for mix mode is available.

FAPG: Favourite Page.
Function: Disable/Enable favourite page in Teletext mode.
Values: OFF= Disabled favourite page in Teletext mode. ON= Enabled favourite page in Teletext mode.

T1H0: 100-Page Text.
Function: Disable/Enable 100-page Text.
Values: OFF= Disabled. 100-page text is not available. ON= Enabled, 100-page text is available.

T2H5: 250-Page Text.
Function: Disable/Enable 250-page Text.
Values: OFF= Disabled. 250-page text is not available. ON= Enabled, 250-page text is available.

T12H: 1200-Page Text.
Function: Disable/Enable 1200-page Text.
Values: OFF= Disabled. 1200-page text is not available. ON= Enabled, 1200-page text is available.

Lock Features
CHLK: Child Lock.
Function: Disable / Enabled function to block/unblock channels.
Values: OFF= Disabled. ON= Enabled.

OSD/Menu Related
SOSD: Smart OSD.
Function: Disable/Enable full display of SMART SOUND and SMART PICTURE OSD.

Values: OFF= Disabled, full display of SMART SOUND and SMART PICTURE OSD not available. ON= Enabled, full display of SMART SOUND and SMART PICTURE OSD available.

Miscellaneous
SBNP: Auto Standby with No Picture.
Function: Disable/Enable automatic switch to standby after 15 minutes when no ident.
Values: OFF= Disabled, no automatic switch to standby. ON= Enabled, set switches to standby after 15 minutes when no ident.

AUSB: Auto Standby Auto On.
Function: Disable/Enable automatic switch to standby if no RC or local keyboard response after 4 hours provided that the set is ON from standby mode by the timer.
Values: OFF= Disabled, no automatic switch to standby. ON= Enabled, set switches to standby after 4 hours.

EPG: Electronic Program Guide.
Function: Disable/Enable EPG feature.
Values: OFF= Disabled, EPG feature is not available. ON= Enabled, EPG feature is available.

P50: P50 (Easylink).
Function: Disable/Enable P50 feature.
Values: OFF= Disabled, P50 feature not available. ON= Enabled, P50 feature is available.

EWEU: East/West Europe region.
Function: Select between East Europe and West Europe.
Values: OFF= West Europe. ON= East Europe

9. Circuit Descriptions, Abbreviation List, and IC Data Sheets

Index of this chapter:

1. Introduction
2. Block diagrams
3. Power supply
4. Video
5. Synchronisation
6. Audio
7. Control
8. Protections
9. Software upgrading
10. Abbreviation list

- Only **new** circuits (circuits that are not published recently) are described.
- For the "known" LSP circuits, see the EM5E manual. This manual is available under number 3122 785 12560 (= English).
- Figures can deviate slightly from the actual situation, due to different set executions.
- For a good understanding of the following circuit descriptions, please use the diagrams in chapter 6 and 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

The A02 is intended as the Mainstream TV platform for the years 2003 and 2004 and successor to the A10. Covering three ranges (Digital Ready, Digital Prepared, and Digital Integrated) with screen sizes of 28 inch WS to 36 inch WS RF (16:9) and 29 inch to 38 inch RF (4:3). The platform supports 50 Hz, 100 Hz, and progressive scan.
It is based on the SALSA system (System Application for Lower Segment Analogue television), which is a highly integrated solution for TV. The system comprises two ICs: the ADOC (Analogue Digital One Chip) and the MPIF (Multi Platform InterFace). The MPIF IC performs analogue processing for IF, source selection, and analogue to digital conversion. The ADOC IC incorporates video and audio processing as well as the complete TV control functionality. The ADOC aims at the low and mid range market segment.

The split-up between an analogue (MPIF) and a digital part (ADOC) has the following advantages:
- High frequent parts (IF) can be included in the concept.
- Less A/D and D/A converters needed for source switching.
- Better performance for AD converters (realised in analogue design environment, more accurate, less tolerance).
- Critical items like reference voltages can be realised in the analogue environment.
- Integrated SCART buffers.

The new A02 chassis has the following features:
- An LSP (Large Signal Panel) that is based on the existing EM5 chassis.
- A new SSB (Small Signal Board) with very high integration.
- Upgradeable main software (via ComPair). The software is a large and re-engineered version of the 'MG' software used by Philips CE for several years.

9.1.1 Large Signal Panel

The chassis has a full sized LSP, which is identical to the one in the EM5 chassis.

The main functionalities of the LSP are:
- Supply,
- Deflection,
- Sound amplification.

The LSP (single sided) is built up very conventional, with hardly any surface mounted components on the copper side. It has a large "hot" part, including both deflection coils.

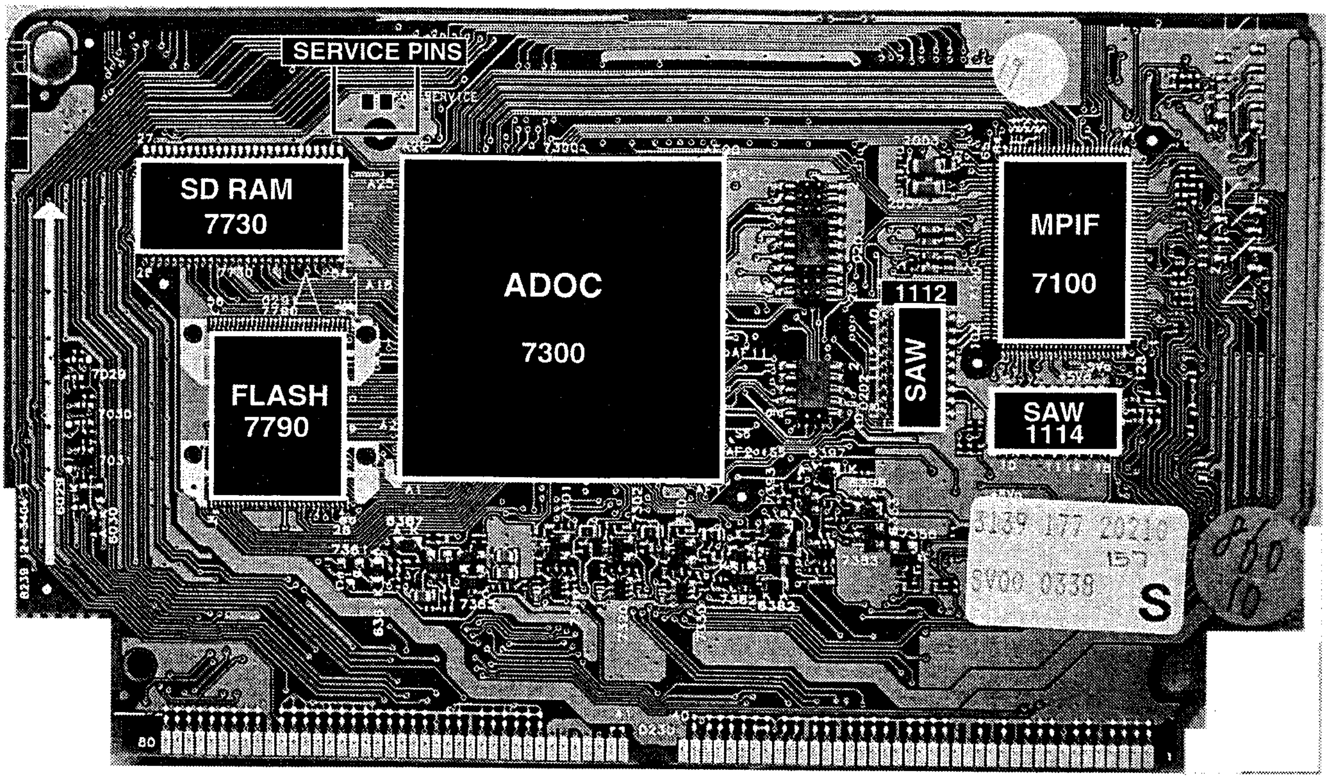
9.1.2 Small Signal Board

The SSB is a high tech module (four layer, 2 sides reflow technology, full SMC) with very high component density. Despite this, it is designed in such a way, that repair on component level is possible. To achieve this, attention was paid to:
- Accessibility of the test points. The SSB has good accessible service positions.
- Clearance around surface mounted ICs (for replacing).
- Detailed diagnostics and fault finding is possible via ComPair.
- Software upgrading is possible via ComPair.

The main functionalities of the SSB are:
- Tuner input,
- I/O interface provisions,
- TXT and Control,
- Video and Audio decoding,
- Feature Box,
- Sync and Geometry control.

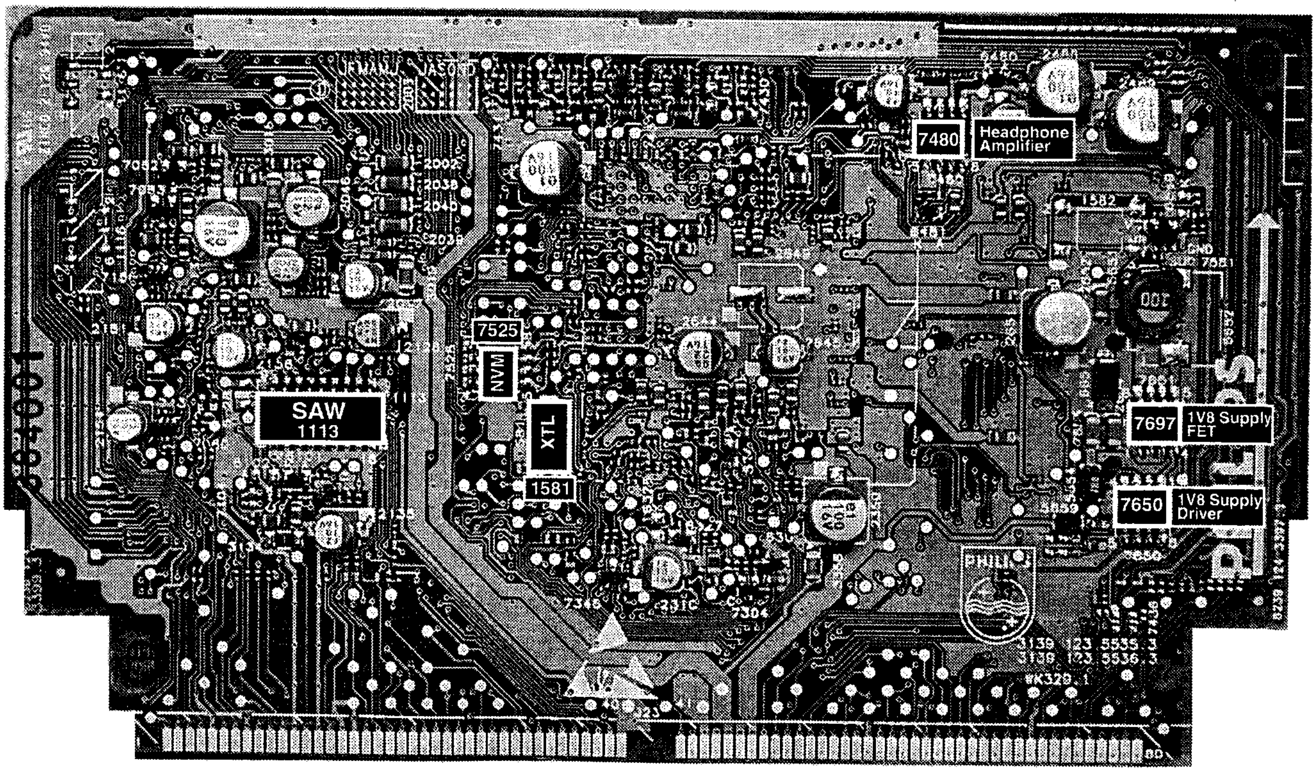
Further features of the SSB are:
- The PIP functionality (when present) is integrated on the SSB.
- The 3D Comb filter functionality (for USA) is integrated on the SSB.

On the photographs you can see where the key components are located on the SSB:


SERVICE PINS
SD RAM
7730
ADOC
7300
MPIF
7100
1112
SAW
FLASH
7790
SAW
1114
S

CL 36532058_060.eps
281003

Figure 9-1 SSB top view (tuner side)


7480
Headphone
Amplifier
7525
NVM
XTL
1581
SAW
1113
7697
1V8 Supply
FET
7650
1V8 Supply
Driver

CL 36532058_061.eps
271003

Figure 9-2 SSB bottom view (LOT side)

9.2 Block Diagrams

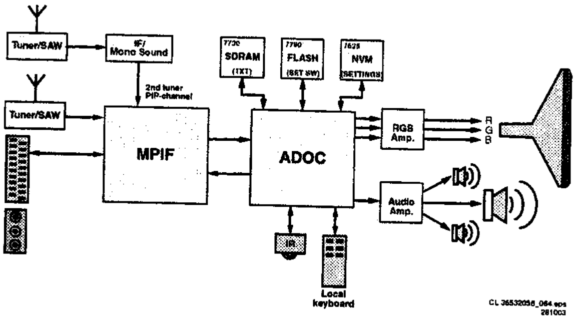


Figure 9-3 Chassis block diagram

The tuner is a PLL tuner and delivers the IF-signal, via audio and video SAW-filters, to the MPIF IC (Multi Platform InterFace). This is an analogue video and audio pre-processing unit for the ADOC TV processor. It contains the high frequent IF part and all the analogue video and audio source switching for external in- and outputs. The MPIF can handle CVBS, Y/C, RGB (1fH/2fH) and YPbPr (1fH/2fH) video signals as well as stereo, I2S, and second sound IF audio signals. The MPIF converts the selected video and audio streams from the analogue to the digital domain. Via three high-speed serial data links (I2D), the digitised audio and video signals are streamed to the ADOC IC for further processing.

The ADOC (Analogue Digital One Chip) is a fully integrated, digitally implemented TV processor for audio, video, Vertical Blank Interval services, graphics, and control. It is a global, multi-standard system primarily designed for the reception and processing of analogue broadcast signals.
Internal video processing is done in the ADOC with YUV-signals. It also handles the video control, geometry part, and the insertion of the TXT/OSD RGB-signals. The video part delivers the RGB signals to the CRT-panel and the geometry part delivers the H-drive, V-drive (differential output), and E/W-drive.
An integrated MIPS 1910 processor runs the chassis software and takes care of the set control, error generation TXT/OSD input-, and output processing. The NVM (Non Volatile Memory) is used to store the settings, the Flash-RAM contains the set software, and the SDRAM stores the Teletext pages (in some versions, this is stored in the internal memory of the ADOC).

Both deflection circuits are located on the LSP and are driven by the ADOC. The horizontal output stage generates also some supply voltages and the EHT-, focus- and Vg2-voltages.

The RGB amplifiers on the CRT-panel are integrated in one IC and are supplied with 200 V from the LOT. The SCAVEM circuit modulates transitions of the Luminance (Y) signal on the horizontal deflection current, giving a sharper picture.

Sound IF processing, audio source selection, and audio analogue-digital signal conversions are done in the MPIF IC. The ADOC contains a digital TV sound processor for analogue and digital multi-channel sound systems in TV sets. By hardware programming, several applications can be scaled.
The audio output stage is built around a balanced amplifier, and is located on the LSP. It uses a monolithic integrated power amplifier IC, the TDA7497. The gain of the amplifier is constant. This means that volume control is done via the ADOC.

The power supply is a Switch Mode Power Supply (SMPS) with minimum voltage switch. It is a flyback converter with primary current sensing, secondary voltage sensing, and mains input measuring. It is built around IC7921 (which has a built-in MOSFET and control circuit) and generates a.o. the 140 V (V-BAT) and the 27 V (for the audio part).
During Standby, the power supply is switched to a 'low power burst mode' via TS7946 and the following burst mode generator, in order to reduce the power consumption.
A relay is used to switch the degaussing circuit for several seconds during switching 'ON' of the set.
There is a separate Standby Supply, in order to reduce the Standby power consumption. During Standby, the Main Supply is switched "off" (via TS7529).
A relay (1550) is used to switch the Degaussing circuit. It is switched "on" after set start-up and switched "off" by the microprocessor after 12 s.
The Main Supply, a SMPS based on the "boost converter" principle, generates the 141 V (V_BAT) and the +/- 16 V for the audio part.

9.3 Power Supply

9.3.1 Introduction

The power supply circuitry is located on the large signal PWB, together with the audio amplifier and the deflection. It comprises of:

- Mains entrance with fuse.
- Separate standby -supply.
- Mains harmonic circuit.
- Mains rectifier.
- Main-supply: is able to deliver a continuous power between 100 W and 160 W.
- Degaussing.

For a detailed circuit description, see the EM5E Service Manual.

9.3.2 Power Supply architecture

The A02 SSB is supplied by +5V, +5.2V, +3.3V and +8V supply lines from the LSP. The SSB contains:

- A DC/DC converter which steps down +5.2V to +1V8,
- A switch to cut off the 3V3 supply to the 3D Comb in "Standby" mode, and
- A regulator to generate the 2V5.

When the set is in "Power STANDBY" mode, the +5.2V, +3.3V supply lines are present. Consequently, only the ADOC IC (+3V3 and +1V8), the SDRAM (+3V3), the Flash memory (+3V3), and the NVM memory (+3V3) are supplied. Other than NVM, all the other devices are powered down in "Standby" mode. See section below for more details on the power modes.

OFF Mode
The set is completely switched "off" from the mains. This is done with the mains switch for Europe and AP (for NAFTA it would mean disconnecting the TV from the mains by pulling out the mains cable). Depending upon the last Standby Status (stored in NVM), this mode can transit to "ON' mode or "STANDBY" mode.
The transition timing for a Cold start from "OFF" state to "ON" shall be such that from the instance the ADOC gets a hard reset, within 3 seconds one will hear the audio and within 7 seconds one will see the picture.

ON Mode
This is the normal operating mode. All the power supply lines on the A02 SSB and LSP are available. All the circuits in the set are active. From this mode, it is possible to transit to "STANDBY", "SEMI-STANDBY", "PROTECTION", or "OFF" mode.

STANDBY Mode
The total power consumption of the TV set in this mode is equal or less than 1 W. The Standby state will be indicated by the LED. In this state only the ADOC, SDRAM, Program Memory, NVM, and all means to wake-up the set are powered. Rest of

the A02 sub-systems are disconnected. This is controlled by a STANDBY control port.
The transition timing from "STANDBY" to "ON" state is such that within 3 seconds, one will hear the audio and within 7 seconds, one will see the picture. From this mode, it is possible to transit to "ON", "SEMI-STANDBY", or "OFF" mode.

SEMI-STANDBY Mode

All the circuits in the set (ADOC, MPIF, etc), except the Audio output, Deflection, and hence CRT display, are powered up and fully active. The Audio Mute is activated. The set, however, will appear to behave and to look like "STANDBY" mode to the user. The user is totally oblivious of the existence of this mode. The status of the power supply lines and the estimated total power consumption of the SSB are the same as "ON" mode.
In this mode, the ADOC ICs horizontal deflection drive output is disabled, while the STANDBY control port is disabled. This consequently causes the LOT stage on the LSP to be inactive (although V_batt voltage is present) that, in turn, will cause the EHT to be cut off. This in turn will cause the CRT display to be inactive.
From this mode, it is possible to transit to "ON" mode, "STANDBY" mode, "PROTECTION" mode or "OFF" mode.

PROTECTION Mode

Power profile for protection mode is as low as required to allow "soft" diagnostics, error detection, and to indicate LED flashes to flag the type of fault. The horizontal deflection is "OFF" in this mode. From the protection mode, the only possible transition is to "OFF" mode.

9.3.3 Start Up Sequence

1. When we start the set (cold start), initially 5V2, 3V3, and 1V8 will be available. These come from the Standby module of the power supply.
2. After this, the microprocessor resets (tied to 1V8 and 3V3 supplies) and checks the last status of the supply from the NVM. Accordingly, the set will be put in STANDBY or in the normal ON condition.
3. Now, 5V and 8V are available if the last status was ON condition, and the DOP is initialised by the microcontroller through the PI bus (not via the I2C).
4. The H-drive will become available from the DOP, which is the source for the SUP_ENABLE signal.
5. Via the "SUP-ENABLE" signal, the Main Supply is switched "on" and will deliver the V_BAT to the Line deflection stage.
6. EHT generation is now started.
7. The uP will un-blank the picture.
8. When you switch "off" the set, this is done in a controlled way via the POR (Power On Reset) signal.

Note: Standby is controlled by the STANDBY Line of the uP (not by the DOP).

9.3.4 Shut Down Sequence

This section describes the processes that need to be handled by hardware and software when power is disconnected from the set.
Some system requirements:

- To handle CRT discharge.
- To handle "switch off" plops.
- To prevent NVM corruption at switch "off".
- To effectively distinguish between the condition of mains interruptions and shutdown and handle them properly.
- The "power down" detection is acquired from the deflection supply (+11V) and the level is translated to +3.3V (this event has the highest interrupt priority to trigger SW shutdown procedure).
- Power down detection is fed to the FBCIN input, initiates a slow stop, and hence ensures CRT discharge (it is important that the slow-stop is maintained for at least 50 ms to assist good discharge).
- The microcontroller, hence the system, shall have a clean power "on" and power "off" reset with respect to its supply. The microcontroller shall not be operational when the supply voltage is below the recommended limits. The transition between active and reset is fast.
- The microcontroller "off" reset must occur much later (> 45 ms) than the POWER DOWN signal (P.DN).

When the POWER DOWN interrupt occurs, there is no way of knowing whether it is due to Medium Mains Interruptions or due to shutdown. Hence, there is no choice but to initiate shutdown procedure as described further below. The definition of Mains Interruption is given below:

- **Short Mains Interruptions.** Duration of the interrupts <= 55 ms. The set shall continue to work properly. The "power off" acquisition circuit shall filter such events.
- **Medium Mains Interruptions.** Interruptions are of the order 70 to 80 ms. This is a typical situation when the "power off" acquisition circuit, signals that the power is going down but the microcontroller does not get a reset. In this condition, a POWER DOWN signal is generated but no POWER OFF RESET signal is available.
- **Long Mains Interruption or Shutdown.** Any interrupt above 80 ms shall cause a microcontroller reset and hence a cold start. This happens, when the power is disconnected long enough to get a "Power Off Reset" as well as the microcontroller reset. After this situation, the system would automatically cold start when the power resumes.

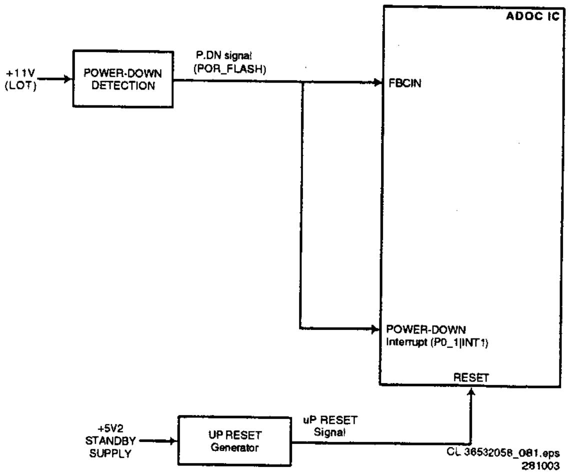


Figure 9-4 Shut down block diagram

Shutdown Procedure

1. Exclude all processes and do not respond to any interrupts - including RC events. However, during the following defined conditions of stopping the deflection (DFL-bit= 0), ignore the P.DN interrupt and rest of the procedure:
   - The system switched from ON to Standby by the user.
   - Protection event that forces the H-Deflection to stop.
   - Any other SW controlled event that causes the deflection to stop.
2. Since the P.DN signal is connected to FBCIN input, the DOP shall slow stop immediately - no software intervention is required. The precondition for this is that the FBDM bit in DOP is set to "1". The slow -stop process will continue for the next 40 ms or so.
3. Mute Audio Output / Sound Enable line.
4. Mute audio external outputs (in ADOC).
5. Set the DFL-bit to "0", such that deflection shall not restart after the slow -stop process is done.
6. Disable NVM access. Do the following:
   - Put the NVM in standby state to stop I2C write to NVM, by sending the Universal Reset Sequence.
   - Set Write Enable high: this avoids any further Write sequence to the NVM.
7. Disable all the I2C hardware communication.

8. Wait for 200 ms and execute a cold start when there is no microcontroller-reset signal. This is considered as "medium mains interruption".
9. After the cold start, the set should resume to the last status of user settings.

9.4 Video

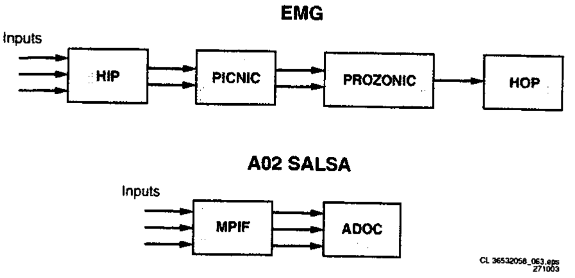


Figure 9-5 Signal processing A02- versus EMG-chassis.

The SALSA video processing part is a highly integrated solution. It comprises only two ICs, the ADOC (Analogue Digital One Chip) and the MPIF (Multi Platform InterFace), while in the EMG-chassis, this was handled by four ICs (HIP, PICNIC, PROZONIC, and HOP).
The MPIF uses a nominal 8V and 5V supply, while the ADOC requires nominal supplies of 1.8V and 3.3V.

The video processing of the SALSA system can be spilt into six parts:
- Initial source selection and analogue to digital conversion performed by MPIF.
- Demodulator (VIDDEC) performed by the ADOC.
- Front End Features (FEF) performed by the ADOC.
- Memory Based Features (MBF) performed by the ADOC.
- Back End Features (BEF) performed by the ADOC.
- Digital Output Processing (DOP) performed by the ADOC.

9.4.1 MPIF Analogue Frond End

Introduction
The MPIF (Multi Platform InterFace, type number PNX3000, item number 7100) is an analogue video and audio pre-processing unit for the ADOC TV processor. It contains the high frequent IF part and all the analogue video and audio source switching for external in- and outputs. The MPIF can handle CVBS, Y/C, RGB (1fH/2fH) and YPbPr (1fH/2fH) video signals as well as stereo, I2S, and second sound IF audio signals. The MPIF converts the selected video and audio streams from the analogue to the digital domain. Via three high-speed serial data links (I2D), the digitised audio and video signals are streamed to the ADOC IC for further processing. Following figure shows the MPIF block diagram.

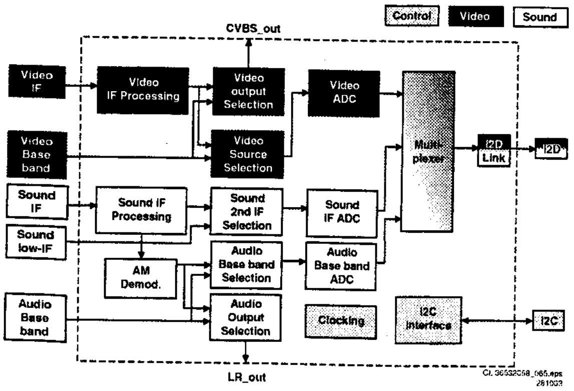


Figure 9-6 MPIF block diagram

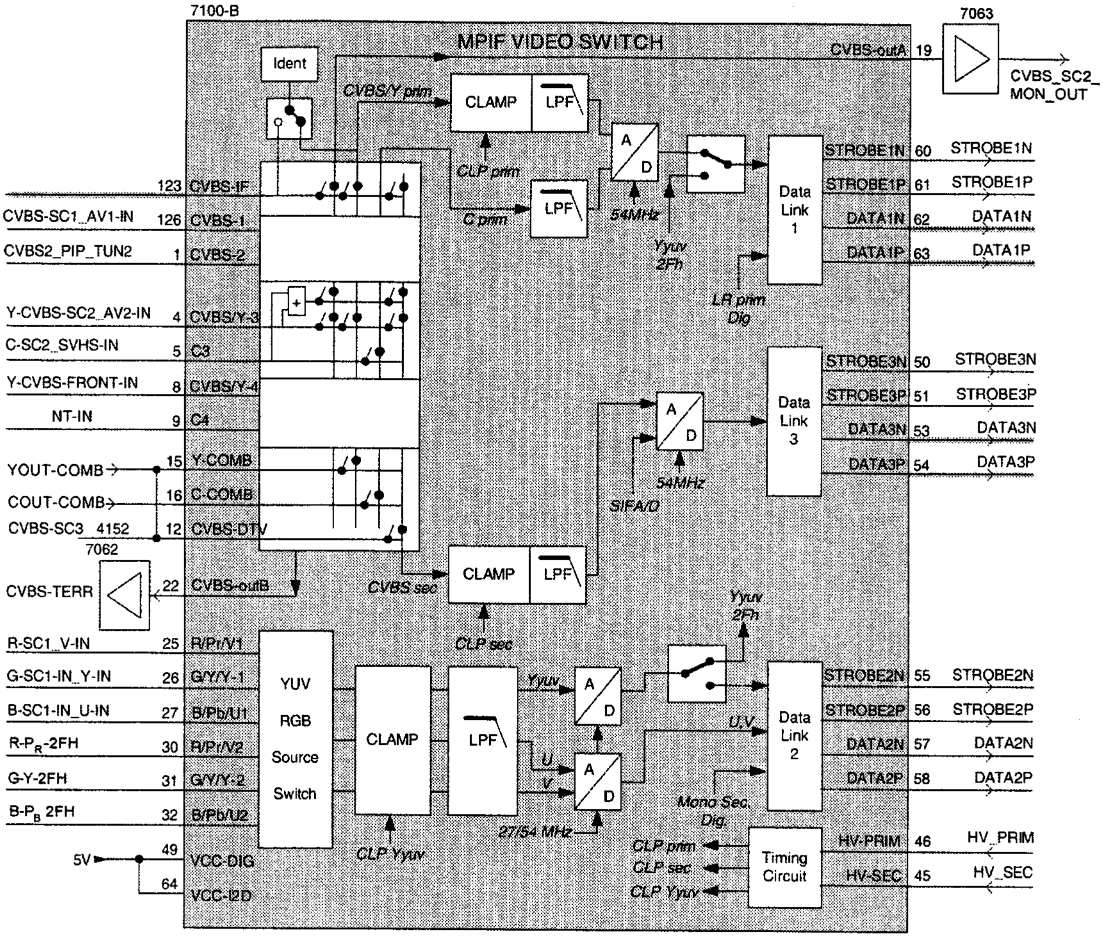
Some MPIF features:
- IF Processing:
  - Amplifier, AGC.
  - Down mixer to base band.
  - Sound trap, low pass filter.
- Video base band switching:
  - CVBS, Y/C.
  - RGB, YPbPr (1fH/2fH).
- Audio base band switching.
- Video and audio A/D conversion.
- I2D formatter:
  - Data transfer to ADOC.
- SCART output buffers.

Vision IF
The video signal is demodulated by means of an alignment-free PLL carrier regenerator with an internal VCO. This VCO is calibrated by means of a digital control circuit, which uses an external crystal frequency as reference. The frequency setting for the various standards (33.4, 33.9, 38.0, 38.9, 45.75 and 58.75 MHz) is realised via the I2C bus.
The AFC output is generated by the digital control circuit of the IF-PLL demodulator and can be read via the I2C bus.
The AGC-detector operates on top sync or top white level.
The MPIF IC has an integrated sound trap filter. The trap frequencies can be switched via the I2C-bus.
Also, a group delay correction filter is integrated. The filter can be switched between the PAL BG curve and a flat group delay response characteristic. This has the advantage that in multi-standard receivers the video SAW filter does not need to be switchable (cost effective).

Sound IF
The MPIF has a separate sound IF input to enable Quasi Split Sound (QSS) applications. The sound IF amplifier is similar to the vision IF amplifier and has a gain control range of about 55 dB.
The AGC detector measures the SIF carrier levels (average level of AM or FM carriers) and ensures a constant signal amplitude for the AM demodulator and QSS mixer.
For applications without SIF SAW filter, the IC can also be used in intercarrier mode. In this mode, the composite video signal from the VIF amplifier is fed to the QSS mixer and converted to the intercarrier frequency. AM sound demodulation is realised in the analogue domain with the QSS mixer.

Source Selection
The following selector parts can be identified:
- **CVBS/YC source selector.** The video input selector consists of four independent source selectors, that can select between the CVBS signal coming from the IF part and four external CVBS signals. Two of the external CVBS inputs can also be used as YC input. One selector is used for selection of the primary video channel. A second selector selects the CVBS or YC signal for the secondary channel. The third and fourth selectors are used for selection of analogue CVBS outputs A and B for SCART or line output. The primary channel can be a CVBS or YC signal. If an YC signal is selected for the secondary channel or external CVBS outputs A or B, the luminance and chrominance signals are added so that a CVBS signal is obtained. The video identification circuit detects the presence of a video signal on the CVBS_IF input (CVBS0). The identification output can be read via I2C bus and is normally used to detect transmitters during search tuning.
- **RGB/YPbPr source selector.** The IC has two RGB inputs. Both inputs can also be used as YPbPr input for connection of video sources with an YPbPr output like a DVD player. The RGB inputs can also be used for fast insertion of RGB signals (for instance on screen display menu's) in the primary CVBS signal. The fast insertion switch is located in the digital video processor. The RGB signals are converted to YUV before further processing. The YUV output signal is digitised with the help of two A to D converters. The U and

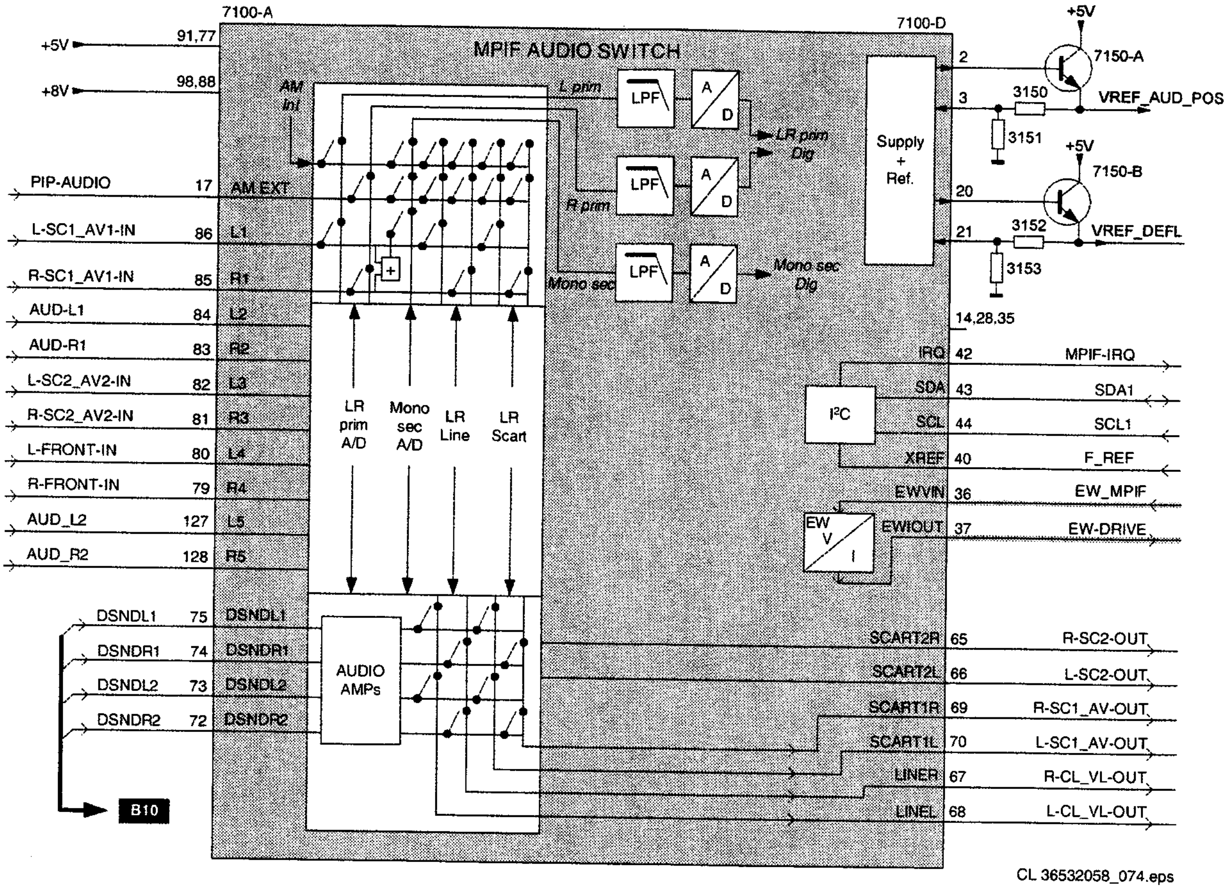
V components have half the bandwidth of the Y signal, because the U and V signals are multiplexed and digitised with the help of **one** A to D converter.


7100-B
MPIF VIDEO SWITCH
Ident
CVBS/Y prim
CLAMP
LPF
CLP prim
C prim
LPF
A
D
54MHz
Yyuv 2Fh
Data Link 1
LR prim Dig
CVBS-outA 19
7063
CVBS_SC2_ MON_OUT
STROBE1N 60 STROBE1N
STROBE1P 61 STROBE1P
DATA1N 62 DATA1N
DATA1P 63 DATA1P
123 CVBS-IF
CVBS-SC1_AV1-IN 126 CVBS-1
CVBS2_PIP_TUN2 1 CVBS-2
Y-CVBS-SC2_AV2-IN 4 CVBS/Y-3
C-SC2_SVHS-IN 5 C3
Y-CVBS-FRONT-IN 8 CVBS/Y-4
NT-IN 9 C4
YOUT-COMB 15 Y-COMB
COUT-COMB 16 C-COMB
CVBS-SC3_4152 12 CVBS-DTV
7062
CVBS-TERR 22 CVBS-outB
CVBS sec
CLAMP
LPF
CLP sec
A
D
54MHz
SIFA/D
Data Link 3
STROBE3N 50 STROBE3N
STROBE3P 51 STROBE3P
DATA3N 53 DATA3N
DATA3P 54 DATA3P
R-SC1_V-IN 25 R/Pr/V1
G-SC1-IN_Y-IN 26 G/Y/Y-1
B-SC1-IN_U-IN 27 B/Pb/U1
R-P$_R$-2FH 30 R/Pr/V2
G-Y-2FH 31 G/Y/Y-2
B-P$_B$ 2FH 32 B/Pb/U2
YUV RGB Source Switch
CLAMP
LPF
CLP Yyuv
Yyuv
U
V
A
D
A
D
27/54 MHz
Yyuv 2Fh
U,V
Mono Sec Dig
Data Link 2
STROBE2N 55 STROBE2N
STROBE2P 56 STROBE2P
DATA2N 57 DATA2N
DATA2P 58 DATA2P
5V 49 VCC-DIG
64 VCC-I2D
CLP prim
CLP sec
CLP Yyuv
Timing Circuit
HV-PRIM 46 HV_PRIM
HV-SEC 45 HV_SEC

CL 36532058_073.eps
071003

Figure 9-7 MPIF Video source selection

- **Audio source selectors.** The MPIF contains two different audio source selectors. The first selector selects which audio signals are routed to the audio ADCs for further processing in the digital domain. The selector has two outputs, a primary channel and a secondary channel:
  - The primary audio channel is used for one stereo signal. The secondary audio channel can carry a second stereo signal or AM sound signal.
  - The second selector selects which audio signals are fed to the analogue audio outputs for SCART and line out. This selector has also two stereo inputs for demodulated sound signals coming from the digital video processor.


7100-A
MPIF AUDIO SWITCH
7100-D
+5V
91,77
+8V
98,88
AM Int
L prim
R prim
Mono sec
LPF
A
D
LR prim Dig
Mono sec Dig
Supply + Ref.
PIP-AUDIO 17 AM EXT
L-SC1_AV1-IN 86 L1
R-SC1_AV1-IN 85 R1
AUD-L1 84 L2
AUD-R1 83 R2
L-SC2_AV2-IN 82 L3
R-SC2_AV2-IN 81 R3
L-FRONT-IN 80 L4
R-FRONT-IN 79 R4
AUD_L2 127 L5
AUD_R2 128 R5
LR prim A/D
Mono sec A/D
LR Line
LR Scart
DSNDL1 75 DSNDL1
DSNDR1 74 DSNDR1
DSNDL2 73 DSNDL2
DSNDR2 72 DSNDR2
AUDIO AMPs
B10
2
3
20
21
14,28,35
+5V
7150-A
3150
3151
VREF_AUD_POS
+5V
7150-B
3152
3153
VREF_DEFL
I²C
IRQ 42 MPIF-IRQ
SDA 43 SDA1
SCL 44 SCL1
XREF 40 F_REF
EWVIN 36 EW_MPIF
EW V I
EWIOUT 37 EW-DRIVE
SCART2R 65 R-SC2-OUT
SCART2L 66 L-SC2-OUT
SCART1R 69 R-SC1_AV-OUT
SCART1L 70 L-SC1_AV-OUT
LINER 67 R-CL_VL-OUT
LINEL 68 L-CL_VL-OUT

CL 36532058_074.eps
071003

Figure 9-8 MPIF Audio source selection

A to D Converters

The MPIF contains four video ADCs for analogue and digital video broadcast signals. The clock frequency for these ADCs is either 27 MHz or 54 MHz. In some cases, two analogue signals are multiplexed at the input of one ADC. In these cases, the clock frequency of the ADCs is 54 MHz, while the sample frequency for each of the two signals is 27 MHz.

The sample frequency for standard 1fH video signals is 27 MHz.
For the YUV channel the sample frequency of the U and V components is half the sample frequency of the Y signal.
For 2fH YPbPr or RGB input signals (for instance 480p or 1080i ATSC signals), the frequency that is used to sample the YUV signals is twice as high as for 1fH signals. The sample frequency is 54 MHz for Y and 27 MHz for U and V.
Due to the high sample frequency, two data links are needed for transport of the video data to the digital video processor.

9.4.2 Data Link Interface (I2D)

The digital interface between MPIF and ADOC is called Data Link (or I2D Link). Data Link is a pin efficient, EMC friendly and power efficient serial interface that transfers the data from MPIF to ADOC over three Data Link interfaces. Each Data Link has a data signal and a strobe signal. The synchronisation information is distributed over the data and the strobe signal. To minimize EMC, both signal outputs are low voltage differential swing signals, with a swing of about 300 mV.
Each Data Link has four lines, one differential pair for the data, and one differential pair for the strobe. The data rate is 594 Mbit/s. Each Data Link can carry two 27 MHz sampled video streams (or one 54 MHz sampled 2fH video stream) and two audio channels sampled at 6.75 MHz.

In the MPIF, the (video and audio) data to be transmitted is multiplexed in an output register of 42 bits. The content of that 42 bits register is serial transmitted on one of the three data links. In the ADOC, the serial data is de-multiplexed into parallel streams. The data on the data link is divided in several groups of signals (video, audio and strobe signals). Obvious it is important that the transmitter and receiver are in the same transmitting mode.

9.4.3 ADOC Digital TV Processor

Introduction

The A02 system is built around the ADOC IC. This chip implements all TV functions in digital technology. Only a few functions (like AD-conversion, IF processing and source select) are implemented in an analogue companion IC, the MPIF.
The ADOC (Analogue Digital One Chip, type number PNX3001-3008, item number 7300) is a fully integrated, digitally implemented TV processor for audio, video, VBI services, graphics, and control. It is a global, multi-standard system primarily designed for the reception and processing of analogue broadcast signals.
An integrated MIPS 1910 processor runs the chassis software. This software is stored in a non-volatile external flash memory (item 7790). Following figure shows the ADOC block diagram.

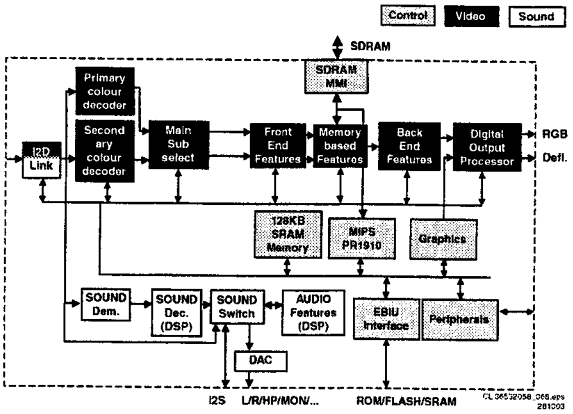

Control
Video
Sound
SDRAM
SDRAM MMI
Primary colour decoder
Secondary colour decoder
I2D Link
Main Sub select
Front End Features
Memory based Features
Back End Features
Digital Output Processor
RGB
Defl.
128KB SRAM Memory
MIPS PR1910
Graphics
SOUND Dem.
SOUND Dec. (DSP)
SOUND Switch
AUDIO Features (DSP)
EBIU Interface
Peripherals
DAC
I2S
L/R/HP/MON/...
ROM/FLASH/SRAM
CL 36532058_066.eps
281003

Figure 9-9 ADOC block diagram

The dual stream architecture of the ADOC system allows audio and video processing of two A/V sources simultaneously. The two video streams can be displayed in several programmable ways (main screen, PIP or DW). The two audio streams are audible via the TV loudspeakers and/or the headphones.
For the memory-based features (like scan rate conversion, 3D-Comb filtering, dynamic noise reduction, and PIP/DW applications), external SDRAM is used (item 7730).
The ADOC also has 128 kBytes of internal SRAM memory. This memory is used to run low latency, timing critical parts of the software. The internal memory is also used if the system operates in a single scan 50/60 Hz interlace application without any other kind of memory based features. Under these circumstances, no external SDRAM is needed.

Some ADOC features:
- Video Decoding:
  - 2-Colour Decoder (PAL, NTSC, SECAM).
  - 2D and 3D Comb filter.
- Memory Based Features:
  - PIP/DW, DNR, Scan Rate conversion.
- Picture Improvements:
  - CTI, LTI, Colour correction.
- Digital Output Processor:
  - RGB processing, Scavem, Deflection control.
- Audio Processing:
  - Demodulator/Decoder (A2, NICAM, BTSC).
  - Tone, Volume, Balance, Dolby ProLogic.
- VBI (Vertical Blank Interval) Services:
  - Teletext, Closed Caption, V-chip.
- TV Control:
  - I2C, UART, IR, Keyboard.
- Graphics:
  - Character based.

Video Decoding (VIDDEC)

The Video Decoder (VIDDEC) is the video input processor and colour decoder. There are two VIDDECs: the primary and the secondary VIDDEC. The VIDDEC processes all CVBS, Y/C, and 1fH/2fH component (e.g. RGB) video input signals.

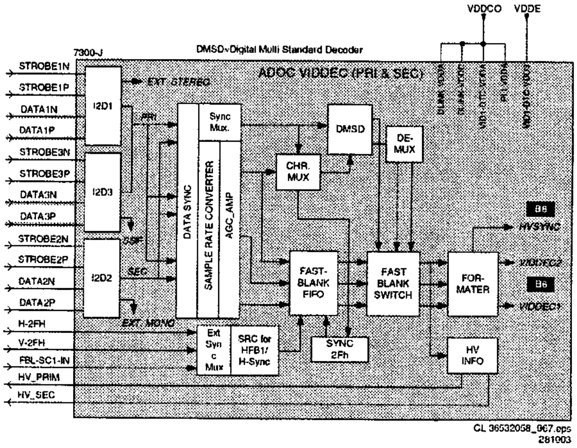

VDDCO
VDDE
7300-J
DMSD-Digital Multi Standard Decoder
ADOC VIDDEC (PRI & SEC)
STROBE1N
STROBE1P
DATA1N
DATA1P
STROBE3N
STROBE3P
DATA3N
DATA3P
STROBE2N
STROBE2P
DATA2N
DATA2P
H-2FH
V-2FH
FBL-SC1-IN
HV_PRIM
HV_SEC
I2D1
I2D3
I2D2
EXT STEREO
PRI
SSIF
SEC
EXT MONO
DATA SYNC
Sync Mux.
SAMPLE RATE CONVERTER
AGC_AMP
DMSD
CHR. MUX
DE-MUX
FAST-BLANK FIFO
FAST BLANK SWITCH
FOR-MATER
Ext Sync Mux
SRC for HFB1/ H-Sync
SYNC 2Fh
HV INFO
B8
HVSYNC
VIDDEC2
B6
VIDDEC1
CL 36532058_067.eps
281003

Figure 9-10 VIDDEC block diagram

Primary VIDDEC (1fH/2fH)

The primary VIDDEC supports the following functionality:
- Conversion of the digitised samples from MPIF into orthogonal samples (meaning fixed number of pixels per line, independently of line frequency).
- Correction for any amplitude errors of the input signals (CVBS, YC, or YCbCr) by means of an Automatic Gain Control (AGC).
- Standard detection of PAL/NTSC or SECAM and various 1fH/2fH component input formats.
- Colour decoding for PAL, NTSC, or SECAM input signals.
- Sync identification (to be used for channel search).
- Sync processing for any 1fH or 2fH input signal.
- Fast-blank insertion of RGB signals (supplied via MPIF) on CVBS input signals.
- 2D Comb filtering. 3D Comb filtering is implemented in the Memory Based Feature block of the Feature Box.

Secondary VIDDEC (1fH)

The secondary VIDDEC is mainly intended for use with PIP/DW. It supports the following functionality:
- Conversion of the digitised samples from MPIF into orthogonal samples (meaning fixed number of pixels per line, independently of line frequency).
- Correction for any amplitude errors of the input signals (CVBS) by means of an Automatic Gain Control (AGC).
- Standard detection of PAL/NTSC or SECAM and various 1fH component input formats.
- Colour decoding for PAL, NTSC, or SECAM input signals.
- Sync identification (to be used for channel search).
- Sync processing for any 1fH input signal.
- CVBS 1fH input signals only.

Data Synchroniser and Sample Rate Converter

The data synchroniser is a de-multiplexer that separates the UV stream into a separate U and V data stream. The sample rate converter converts the video samples from the crystal clock domain to the so-called line locked clock domain, 720 pixels per line.

Automatic Gain Control (AGC)

The AGC amplifier block controls the gain of the signal and is controlled directly by the chassis software. This gain will depend on the amplitude of the output signal (signal amplitude and/or sync amplitude) as measured by the AGC gain block. As a secondary function, it controls both the offset at the input and the offset at the output of the gain control.

Digital Multi Standard Decoder (DMSD)

This DMSD block contains the following functionality:

- Decodes a CVBS or Y/C (primary VIDDEC) signal and converts it to an YCbCr signal format. All world colour standards are supported.
- YC detection (primary VIDDEC) via a SW algorithm.
- 50/60 Hz, interlace/progressive, field polarity, and no-YC detection.
- A chroma notch with programmable width.
- 2D Comb filter (primary VIDDEC). The 3D Comb filter uses the attached SDRAM memory and is implemented in the FBX.
- Macro vision detection.

Comb Filter

The ADOC 2D comb works purely in the vertical direction, but can bypass the entire signal as luminance straight away. The 2D comb uses the 180 degrees phase shift of the colour carrier between successive lines or two lines apart. Adaptive two or four delay lines 2D Y/C comb filtering is only possible for sources routed onto the Main-Video path.

In the 3D comb filter implementation (for USA only), the 2D comb filter processing in ADOC IC (on the Main-Video path) is disabled via SW. The signal input for the 3D YC comb-filter circuit is derived from the CVBS-SC2_MON-OUT signal path. The processed signal is re-inserted back via YCOMB and CCOMB inputs of the MPIF IC.

Standard Detection

The Standard Detection part identifies PAL/NTSC/SECAM/BW but also involves Horizontal and Vertical sync identification (both 1fH and 2fH) as well as YC detection (via a SW algorithm).

YUV Multiplexer

The YUV mixer selects between the YUV output of the DMSD and 1fH component video input signals (RGB, YPbPr) or 2fH input signals (RGB, YPbPr, ATSC). The YUV mixer can also be controlled via a fast blanking input (SCART) to insert RGB signals, such as descrambler OSD or full RGB insertion of DVD players.

When a 2fH input signal is selected as a input, the complete primary VIDDEC is running at 2fH (54 MHz), including DMSD (in this scenario, the DMSD cannot be used any more for CVBS input signals, and as such, VBI data slicing cannot be done).

Feature Box

The Feature Box (FBX) in the ADOC can be divided into three functional parts: The front-end features (FEF), memory-based features (MBF), and back end features (BEF).

The FEF part of the FBX implements all signal analysis functions as well as black stretch and histogram correction.

The MBF part applies spatial scaling, temporal noise reduction and up-conversion to either progressive scan or a double field rate (100 Hz).

The BEF part implements spatial picture enhancement functions like sharpness and colour enhancement functions, sharpness measurement and horizontal scaling and panorama

The FBX has two video inputs coming from VIDDDEC 1 and 2, and outputs one RGB video stream to the display output processor (DOP).

The following sections describe the three functional parts of FBX in more detail.

Front End Features (FEF)

The FEF consists of several signal analysis functions (HME, BLD, BBD, NEST), histogram correction (HMO) and black-stretch (BS). Following figure shows the functional block diagram of the video frond-end features (FEF). All signal processing in the FEF is nine bits based.

The FEF has two video inputs coming from the VIDDECs. For every block, one video source can be chosen as input, independently for every block. The FEF has two video outputs, designated as "main" and "sub".

Histogram modification can only be performed on the main channel; therefore, the HME block is general connected to the same video source as the main channel. Besides the two VIDDEC inputs, there is also a third virtual input, the "blanking" input. Only main and sub can be connected to this blanking input, and at the same time, it can be specified which sync source has to be used (VIDDEC1 or VIDDEC2).

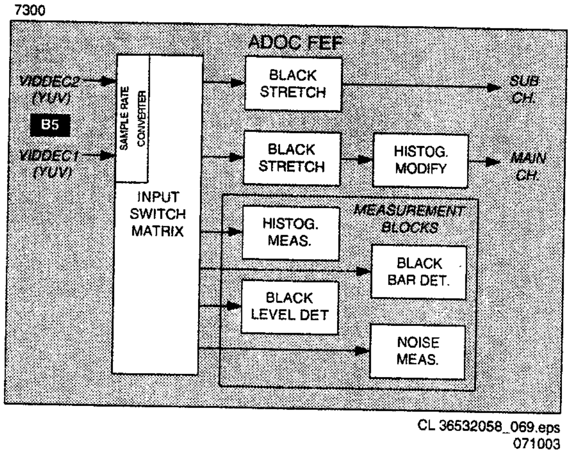


Figure 9-11 FEF block diagram

When a single stream is displayed, the main output is used for this stream. Also, all signal analysis functions should be connected to the same VIDDEC as the main channel is connected to.

When two streams are displayed, then there are two user scenarios: Picture In Picture (PIP) and Double Window (DW). In the PIP scenario, the full screen picture is displayed via the main channel, and the PIP stream is switched to sub. In the DW scenario, selection of the video sources for main and sub depends on if the two streams have a different vertical resolution and how the system has to cope with this difference.

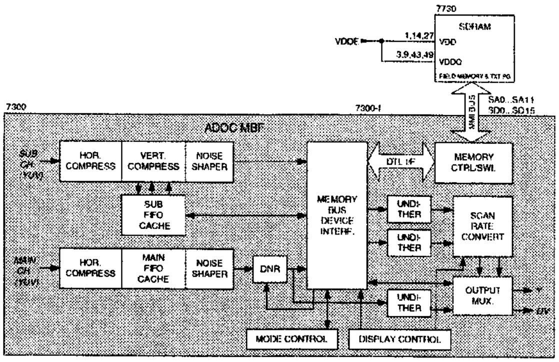
Following blocks are present:

- **Black Stretch (BS).** The function of BS is to pull the dark areas in a picture to even darker levels. BS is available in both the main and sub channel.
- **Histogram (HMx).** This block measures of every field in a programmable (measurement-) window the histogram of the luminance signal. The measurement window is set-up such that the area that contains the subtitles or black bars does not contribute to the histogram.
- **Black Bar Detection (BBD).** Many broadcasts or software played on TVs produce a so-called "letterboxed" picture. Black bars appear above and below the picture. Due to bad standardisation of the aspect ratio, e.g. the size of the black bars, there is a need to actively analyse the picture and determine of the picture is in letterbox format and what the size of the black bars is. Black bars are detected by determining if a defined number of pixels (analysed within a programmable window located in active video) are black. The output of the BBD is the first non-black line and the last non-black line.
- **Black Level Detection (BLD).** The BLD determines within a programmable (measurement) window the "black level" of a picture. The BLD will be used for the BS, but if required, it can also be used for the BBD. The BLD function records in multiple small windows within the measurement window the maximum luminance. The minimum luminance level of the various recorded maximum luminance levels is the true black level. By measuring the maximum luminance level in a small window, the BLD is not sensitive to "black" spikes.
- **Noise Estimation (NEST).** The NEST block analyses the video and outputs a number correlating to the amount of noise in the picture. A basic problem is that picture detail is also 'recognised' as noise. Several control- and status-

registers are added to compensate this. The video signal is only analysed when it is within a programmable (measurement) window. This window coincides with a rectangular shaped part of the (visible) picture. Normally this is the centre part of the picture.

Memory Based Features (MBF)

The Memory Based Features (MBF) block embodies a set of functions that require (shared) memory.
The main and sub video streams can be spatially compressed in order to produce a mixed output in the form of several PIP combinations or DW.
The main video stream can be passed through a temporal noise reduction circuit (DNR).
The 3D Comb filter is also implemented in this block.
The main and sub streams are merged when reading from memory. The merged video stream can be up-converted to either a double line rate (progressive scan) or to a double field rate (100 Hz). The up-conversion is done by means of a digital scan function. Following figure shows the functional block diagram of the video memory based features (MBF).


7730
SDRAM
VDDE
1,14,27
VDD
3,9,43,49
VDDQ
FIELD MEMORY & TXT PG
7300
7300-I
SAO..SA11
SD0..SD15
MMI BUS
ADOC MBF
SUB CH (YUV)
HOR. COMPRESS
VERT. COMPRESS
NOISE SHAPER
SUB FIFO CACHE
MAIN CH (YUV)
HOR. COMPRESS
MAIN FIFO CACHE
NOISE SHAPER
DNR
MEMORY BUS DEVICE INTERF.
DTL I/F
MEMORY CTRL/SWI.
UNDI-THER
UNDI-THER
UNDI-THER
SCAN RATE CONVERT
OUTPUT MUX.
Y
UV
MODE CONTROL
DISPLAY CONTROL

CL 36532058_070.eps
071003

Figure 9-12 MBF block diagram

Back End Features (BEF)

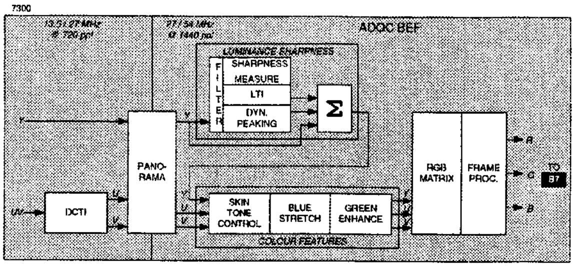
The Back End Features (BEF) block embodies a collection of spatial picture enhancement functions.
The video display has to be blanked during AV switching, channel switching, V-chip, and Child Lock modes. This is done inside the BEF block of the ADOC IC. The fast blanking signal input from SCART1and SCART3 (TV SCART inputs) for RGB video insertion is connected to the ADOC IC.

Sharpness functions are:
- Luminance Transient Improvement (LTI),
- Dynamic Peaking, and
- Digital Colour Transient Improvement (DCTI).

The panorama block does the non-linear scaling for displaying 4:3 formats on a wide-screen display.

Colour enhancement functions are:
- Skin Tone Control,
- Blue Stretch, and
- Green Enhancement.

A colour Space Converter can convert the video signal from YUV to RGB format. The Frame Processing block can insert frames and borders such as a coloured frame around the Picture in Picture (PIP). Following figure shows the structure of the Back End Feature block.

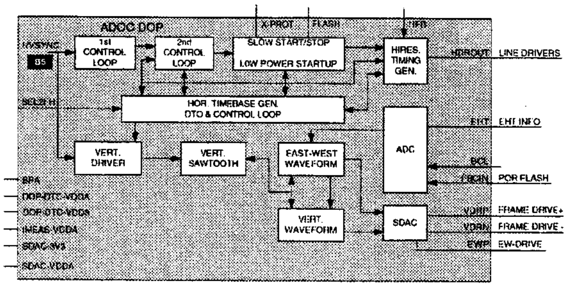

7300
13.5/27 MHz
@ 720 ppl
27/54 MHz
@ 1440 ppl
ADOC BEF
LUMINANCE SHARPNESS
FILTER
SHARPNESS MEASURE
LTI
DYN. PEAKING
Σ
Y
UV
DCTI
U
V
PANO-RAMA
SKIN TONE CONTROL
BLUE STRETCH
GREEN ENHANCE
COLOUR FEATURES
RGB MATRIX
FRAME PROC.
R
G
B
TO
B7

CL 36532058_071.eps
071003

Figure 9-13 BEF block diagram

Digital Output Processor (DOP)

The DOP is a display processor block, and contains the following functions:
- **RGB control processor** with linear RGB input for the main video signal, a linear RGB input for OSD/text signals with blending, and an RGB output stage with black current stabilisation which is realised with the continuous cathode calibration (2-point black current measurement) system.
- **Programmable deflection processor**, driven by an external crystal clock, which generates the drive signals for the horizontal, east-west, north-south and vertical deflection with extensive geometry correction capabilities.
- The circuit can be used in both single scan (50 or 60 Hz) and double scan (100 or 120 Hz) applications.


ADOC DOP
X-PROT
FLASH
HFB
H/VSYNC
B5
1st CONTROL LOOP
2nd CONTROL LOOP
SLOW START/STOP
LOW POWER STARTUP
HIRES. TIMING GEN.
HDRIOUT
LINE DRIVERS
SEL2FH
HOR. TIMEBASE GEN. DTO & CONTROL LOOP
EHT
EHT INFO
ADC
BCL
FBCIN
POR FLASH
VERT. DRIVER
VERT. SAWTOOTH
EAST-WEST WAVEFORM
VERT. WAVEFORM
SDAC
VDRP
FRAME DRIVE+
VDRN
FRAME DRIVE-
EWP
EW-DRIVE
SPA
DOP-DTC-VDDA
DOP-DTC-VDDA
IMEAS-VDDA
SDAC-3V3
SDAC-VDDA

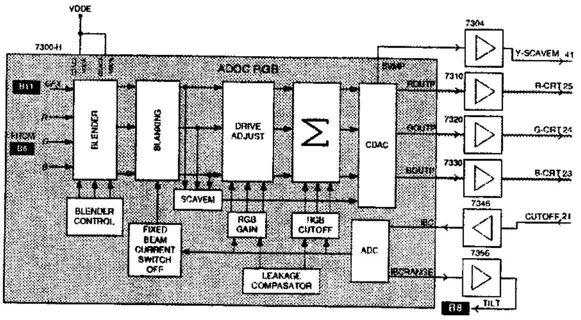
CL 36532058_068.eps
071003

Figure 9-14 DOP block diagram

RGB Control Processing

- The RGB control circuit of the DOP contains two sets of input signals:
  - The first RGB input (RGB), 10 bits wide, is intended for the normal video signals coming from the BEF part. The "RGB" signals will first enter a contrast control stage, followed by a brightness control stage, both influenced by a combination of user control, Beam Current Limiter and Peak White Limiter, followed by a soft clipper stage. Then the signal will be applied to the blender stage. The blender input signal will be used as an input for the peak white limiting system.
  - The second RGB input (GFX), 4 bits wide, is intended for OSD and Teletext signals. The switching between the internal signal and the OSD signal is realised via a blending function. The "GFX" input signals will be re-formatted to 10 bit wide internally before entering the Beam Current Control brightness correction stage, followed by the hard clip stage. Then the signal will also be applied to the blender stage.
- The two input data streams are combined into one stream by the blender. This blender is controlled by a third data stream.
- The next block is the "Drive Adjust" part. It contains a Picture Tube Biasing system, a Beam Current Control, and Peak White Limiting part.

In order to enhance the spatial bandwidth of the CRT display, Scan Velocity Modulation (SCAVEM) is implemented on the CRT-panel.



CL 36532058_076.eps
071003

Figure 9-15 ADOC RGB control block diagram

Synchronisation and Deflection Processing

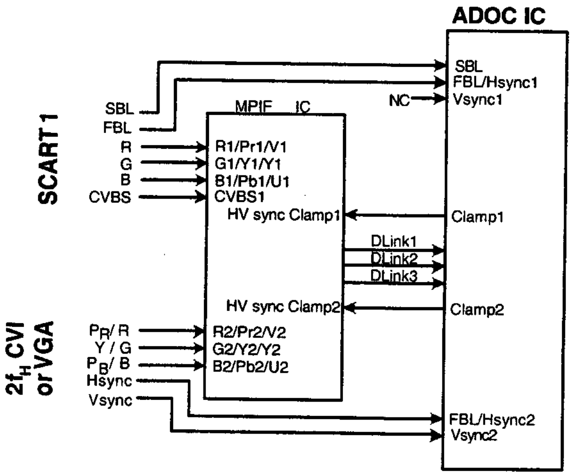
- **Horizontal synchronisation and drive circuit.** The horizontal drive signal is obtained from an internal oscillator, which runs at a fixed frequency of 54 MHz. This oscillator is synchronised to the incoming horizontal H_D pulse by means of a digital PLL. The horizontal drive signal is generated by a second control loop, which compares the phase of the reference signal, applied from the internal DTO, to the horizontal flyback pulse HFB.
- **Vertical deflection and drive circuit.** The drive signals for the vertical and E/W deflection circuits are generated by a vertical divider, which derives its reference signal from the Horizontal Time base Generator. This divider is synchronised by the incoming V_D pulse, generated by the input processor or the Feature Box. The vertical drive output is realised by a differential voltage, which is generated by SDACs. The outputs must be DC-coupled to the vertical output stage (TDA8177, item 7620 on the LSP).

See also figure "DOP block diagram"

9.5 Synchronisation

9.5.1 Sync Flow

The CVBS signal on the SCART1 connector (CVBS-SC1_AV1-IN system signal path; designated as EXT 1 CVBS) is used to provide synchronisation for the EXT1 RGB input. Besides providing synchronisation for RGB source, EXT1 CVBS is also required for SCART2 CVBS output.



CL 36532058_082.eps
281003

Figure 9-16 Sync flow block diagram

For 1fH CVI input, synchronisation is derived from sync-on-Y. For the 2fH CVI input, synchronisation signal is derived from sync-on-Y input or the H_SYNC/V_SYNC.
In case of VGA input, synchronisation signal is taken from H_SYNC and V_SYNC inputs

9.6 Audio

9.6.1 Introduction

Sound IF processing, audio source selection, and audio analogue-digital signal conversions are done in the MPIF IC. SIF demodulation, sound system auto-detection, audio base-band, and headphone processing is done in the ADOC IC. Therefore, the ADOC contains a digital TV sound processor for analogue and digital multi-channel sound systems in TV sets. By hardware programming, several applications can be scaled.

The sound processing of the SALSA system can be split into three parts:

- Initial source selection and analogue to digital conversion performed by MPIF.
- Demodulator and Decoder (DEMDEC) performed by the ADOC.
- Back End Features (BEF) performed by the ADOC.

9.6.2 MPIF Sound part

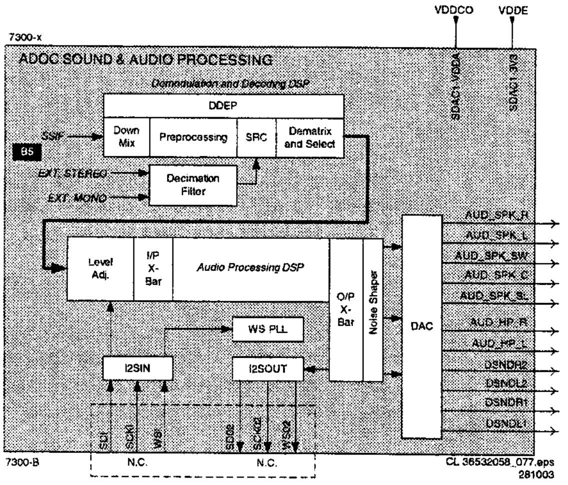
The (main) Tuner receives an RF signal and converts it to IF. Via the appropriate SAW filters, the SIF signal is delivered to the QSS mixer stage of the MPIF IC and if channels according to standard L/L' are received also to the AM demodulator. The Quasi Split Sound demodulation generates the SSIF or intercarrier signal. By the SSIF switch, it is possible to choose between the internally derived intercarrier and an external second SIF (e.g. from a PIP front end or 10.7 MHz radio). The selected SSIF passes some anti-alias filtering, is amplified in an AGC amplifier and is then converted from analogue to digital (SSIF AGC/ADC). Together with other signals, the digitised SSIF is transferred via an I2D-Link to the ADOC IC.
The audio signal out of the AM demodulator is connected to the analogue X-bar in the MPIF IC. All other inputs to this multiplexer/audio switch come from external, either from the PIP front end (AMEXT/PIPMONO) or SCART/CINCH (AUDxin) or the DAC1, DAC2 output signals from ADOC. The audio AD converters are digitising the audio signals foreseen for further digital processing in ADOC. Three stereo outputs (AUDx out, LINE out) are available for connections to SCART/CINCH sockets.
The sound part of ADOC consists of the demodulator/decoder (DEMDEC), sample rate conversion (SRC), a digital input X-bar, the digital audio processing for the loudspeaker, headphone and DAC channels, the I2S processing and interfacing as well as the DA conversion. This part will be described in the next chapter.

9.6.3 ADOC Sound part

Introduction
The ADOC sound part contains two DSP cores as shown in the block diagram. The first core called DEMDEC-DSP is combined with DEMDEC (Demodulation/Decoding) hardware and the second core is the AUDIO-DSP. The DEMDEC-DSP is used for the decoder and demodulator tasks, plus the sample rate conversion.
The AUDIO-DSP is used for the sound features, from the level adjust unit up to the output cross bar. Audio DACs and I2S hardware (optional) are converting the processed signals to analogue or digital audio.

All I2D data links carry sound signals. The data link processing splits them from the other signals as video so that the DEMDEC block receives the second sound IF (SSIF) and the audio

signals from the audio ADCs of the MPIF IC. The SSIF needs some hardware processing before it enters the DEMDEC DSP. The DEMDEC processing will be described in the next chapter. The audio signals from the audio ADCs of the MPIF are passing the DEMDEC DSP only for source selection and sample rate conversion.
In this chassis, two of the DAC **outputs** are used to feed a headphone. Two other DAC stereo outputs are provided for the audio feedback to the MPIF IC. They are located to pins of the ADOC that suit best for connection to MPIF.



CL 36532058_077.eps
281003

Figure 9-17 ADOC sound processing block diagram

DEMDEC DSP

The output signals of the above-mentioned hardware blocks, plus four audio ADC channels are read in by the DEMDEC DSP, processed, converted to the current audio sample rate, "demultiplexed", and forwarded to the Audio DSP for further processing (volume, tone control, effects etc.).

Down Mixer

The digitised SSIF input signal is fed to the mixers, which mix one or both input sound carriers down to zero IF.

Pre-processing

This part contains the sound system identification and demodulation circuitry.

Audio Sample Rate Conversion (SRC)

All input signals pass through a sample rate conversion to the actual output sample rate (usually 48 kHz) such that the output rate does not need to be synchronised with any of the input rates. Up to five separate channels can be converted.

Audio Processing DSP

This block applies several filters, like down-sampling and de-emphasis, noise reduction processing, performs a sample rate conversion (SRC) to the current audio sample rate, and routes the decoded signals to the output channels.
The generic processing controls are Volume, Bass, Treble, Balance, Incredible Surround, Spatial (incredible mono), DBE, Dynamic Ultra Bass II (for non-woofer sets only), AVL, Sub-Woofer, and 5-band Graphic equaliser.
The Headphone volume can be separately controlled in the Headphone menu without affecting the master volume (the setting of the volume tables will be adapted after fine tuning).
For variable volume output for USA, the DAC1 output will switch to the Main channel and therefore the same volume curve for the Main Channel can be used.

9.6.4 Audio Amplifier

Speakers (diagram A6)

The audio output stage is built around IC7701 , which is a balanced amplifier, and is located on the LSP. It uses an monolithic integrated power amplifier IC, the TDA7497. The gain of the amplifier is constant. This means that volume control is done via the ADOC.
The supply voltage is +28 V, generated by the power supply via L5506 (or L5512). The TDA7497 delivers an output of 3 x 10 W_rms to two full range speakers and an (optional) subwoofer.

Muting

There are three types of muting available: system mute, headphone status mute, and user mute.

- **System mute.** System muting is implemented for "special events" such as channel/source change event, loss of identification signal, "on/off" switching of the set, during search and auto store/program, and/or sound mode change. This muting is transparent to the user. Audio output is muted before the above "special events" occurred, to prevent problems such as audible plop. Muting is done via the SOUND-ENABLE (software controlled) and/or POR (hardware controlled) line connected (via TS7710 and 7711) to pin 10 of the amplifier-IC and coming from the ADOC microprocessor.
- **Headphone status mute.** A headphone status is available to detect the presence of the headphone and mute the main speakers if the headphone is detected. The microprocessor will read the FRONT-DETECT status.
- **User mute.** This is a mute option available to the user. The user select the MUTE option on the remote control to switch "off/on" the sound output to the main loudspeaker and the (optional) subwoofer.

Headphone amplifier (diagram A7)

The headphone amplifier is built around IC7751 (NJM4556), which is a high-gain, high output current dual operational amplifier. The supply voltage is +5 V.

9.7 Control

9.7.1 Introduction

The MIPS processor within the ADOC performs the control of the complete SALSA system. This part of the document will examine the functions that enable the MIPS to operate and control the remainder of the SALSA system.

Some control features:

- MIPS1910 processor (MIPS).
- Embedded SRAM.
- External Bus Interface Unit (EBIU) for external memory access.
- SDRAM Interface.
- Interrupt Controller.
- Power and Clock management.
- General Purpose I/O (GPIO).
- Analogue to Digital conversion.
- Two x I2C master/slave.
- Two x General Purpose Timers.
- UART.
- Two x Multi-standard VBI Data Capture Unit.
- EJTAG (for debug and boundary scan functions).
- Remote Control (Infra Red) pre-processing.
- Graphics.

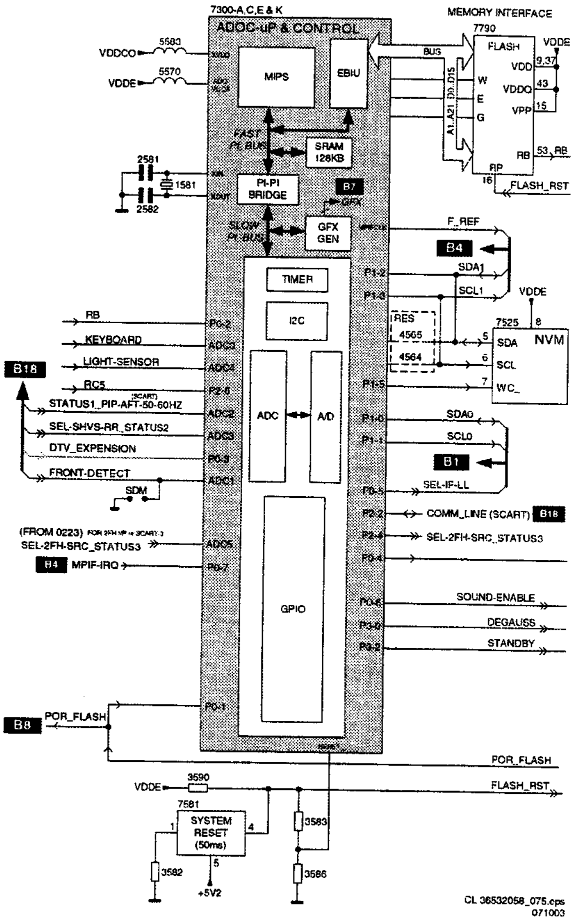

7300-A,C,E & K
ADOC-uP & CONTROL
MEMORY INTERFACE
7790
FLASH
VDDE
MIPS
EBIU
SRAM 128KB
PI-PI BRIDGE
GFX GEN
FAST PI BUS
SLOW PI BUS
VDDCO
VDDE
5583
5570
2581
1581
2582
B7
F_REF
B4
SDA1
SCL1
VDDE
TIMER
I2C
RES
4565
4564
7525
SDA
SCL
WC_
NVM
RB
KEYBOARD
LIGHT-SENSOR
RC5
STATUS1_PIP-AFT-50-60HZ
SEL-SHVS-RR_STATUS2
DTV_EXPENSION
FRONT-DETECT
SDM
B18
ADC
A/D
SDA0
SCL0
B1
SEL-IF-LL
COMM_LINE (SCART)
SEL-2FH-SRC_STATUS3
(FROM 0223)
MPIF-IRQ
GPIO
SOUND-ENABLE
DEGAUSS
STANDBY
B8
POR_FLASH
FLASH_RST
3590
7581
SYSTEM RESET (50ms)
3583
3582
3586
+5V2
CL 36532058_075.eps
071003

Figure 9-18 ADOC control block diagram

9.7.2 Internal Bus Structure

PI Bus

The Peripheral Interconnect (PI) bus connects all of the functional blocks within the ADOC device. Physically it is split into four distinct sections. These are referred to as:

- Fast PI Bus.
- Slow PI Bus.
- Video PI Bus.
- Sound PI Bus.

The individual segments of the PI bus are interconnected via PI-PI bridges. When several devices are connected to a bus system section only one of these may have control (ownership) of the bus section at any instant in time. The device that has control is referred to as the bus master, the remaining devices are referred to as slaves. Each bus segment section has a Bus Control Unit (BCU), which allocates bus ownership to the various modules that are capable of being bus masters. A bus master may have ownership of one or more sections of the PI bus.

Extension Bus Interface Unit

The Extension Bus Interface Unit (EBIU) allows various types of memory (ROM/FLASH/SRAM) to be attached to the ADOC IC and must therefore be configured per memory type (in terms of chip select lines, bus width used, and access times). This enables the hardware of the EBIU to correctly address the external memories and apply the correct number of wait states.

9.7.3 Microprocessor Reset

The reset of the device is split between three functions:

- Power-On-Reset (POR). Output is fed to the Power Clock Reset (PCR) block generating a Hard reset (all functions reset).
- PCR. In simplified terms two outputs are available:
  - Hard reset, all blocks within ADOC are reset.
  - Soft reset, a limited number of blocks within the control core are reset.
- GP registers are used to allow software control of the reset to certain blocks within ADOC.

9.7.4 External Bus Structure

I2C Bus

The system has two system I2C buses; one for the devices on the SSB and the other for the devices used in the external modules .

- The **I2C-1** system bus, comprises of SCL and SDA, is used to control all the I2C devices on the LSP (the main tuner) and other I2C devices connected to other external panels (PIP Front-End demodulation IC, PIP tuner, etc.). The I2C-1 is a 100 kHz bus and is called as "slow" bus. It is connected to the +5V supply. All these devices are powered down in the Standby mode.
- The **I2C-2** system bus, comprises of SCL2 and SDA2, is used to control all the I2C devices (MPIF, 3D-Comb, NVM, etc.) present on the SSB. The I2C-2 is a 400 kHz bus and is called as "fast" bus. It is connected to the +3.3V supply.

9.8 Protections

For a detailed description, see chapter 5 "Service Modes, Error Codes, and Fault Finding".

9.9 Software Upgrading

In this chassis, you can **upgrade** the software via ComPair. This offers the possibility, to replace the entire SW image without having to remove the flash-RAM from its socket. You can find more information on how this procedure works in the ComPair file. It is possible that not all sets are equipped with the hardware, needed to make software upgrading possible. To speed up the programming process, the firmware of the ComPair interface can be upgraded. See Chapter "Service Modes ..."; paragraph "ComPair" - "How To Order" for the order number.

9.10 Abbreviation list

Table 9-1 Abbreviations

Abbreviation	Description
0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format
2CS	2 Carrier Stereo
A2	Commonly known as two carriers sound (2CS) system
AC (or ac)	Alternating Current
ACI	Automatic Channel Installation: algorithm that installs TV channels directly from a cable network by means of a predefined TXT page
ADC	Analogue to Digital Converter
ADOC	Analogue Digital One Chip
AFC	Automatic Frequency Control: control signal used to tune to the correct frequency
AGC	Automatic gain control (feedback) signal to the tuner.
AM	Amplitude Modulation
ANR	Automatic Noise Reduction: one of the algorithms of Auto TV
AP / A/P	Asia Pacific
AR	Aspect Ratio: 4 by 3 or 16 by 9
ASD	Automatic Standard Detection
AV	External Audio Video
AVL	Automatic Volume Level control
B	Blue
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BBD	Black Bar Detection
BCL	Beam Current Limiter
BC-PROT	PROTection signal to the microprocessor for a too high Beam Current.
BG	System B and G
BLC-INFO	BLack Current INFO
BLD	Black Level Detection
BS	Black Stretch
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used e.g. in LATAM and AP-NTSC countries
C	Chroma (video) / Centre channel (audio)
CL	Constant Level: audio output to connect with an external amplifier
CLUT	Colour Look Up Table
ComPair	Computer aided rePair
CRT	Cathode Ray Tube or picture tube
CSM	Customer Service Mode
CTI	Colour Transient Improvement: manipulates steepness of chroma transients
CVBS	Composite Video Blanking and Synchronization
CVI	Component Video Input
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DAC	Digital to Analogue Converter
DBE	Dynamic Bass Enhancement: extra low frequency amplification
DC (or dc)	Direct Current
DCC	Dynamic Contrast Control
DC-filament	Filament supply voltage
DEGAUSS	Control line. Logic LOW to enable CRT degaussing. Logic HIGH to disable the CRT degaussing.
DFU	Directions For Use: owner's manual
DNR	Digital Noise Reduction: noise reduction feature of the set
DOP	Digital Output Processor (Part of ADOC which takes care of RGB control and delection)
DPL	Dolby Pro Logic
DRAM	Dynamic RAM
DS	Digital Scan
DSP	Digital Signal Processing
DST	Dealer Service Tool: special remote control designed for dealers to enter e.g. service mode (a DST-emulator is available in ComPair)
DTS	Digital Theatre Sound
DVD	Digital Versatile Disc
DVI(-d)	Digital Visual Interface (d= digital only)
DW	Double Window
DYN-FASE-COR	Dynamic phase correction, to correct the phase of the H-drive
EEPROM	Electrically Erasable and Programmable Read Only Memory
EHT	Extra High Tension
EHT-INFO	Extra High Tension INFOrmation, used for contrast reduction, vertical and horizontal amplitude correction, beam current protection, and flash detection
EMI	Electro Magnetic Interference
EPG	Electronic Program Guide: system used by broadcasters to transmit TV guide information (= NexTView)
EPLD	Erasable Programmable Logic Device
EU	Europe
EW	East West, related to horizontal deflection of the set
EW-DRIVE	East -West correction drive signal.
EXT	EXTernal (source), entering the set by SCART or by Cinches (jacks)
FBL	Fast BLanking: DC signal accompanying RGB signals
FBX	Feature Box: module which contains 100 Hz processing, Pixel Plus, and AutoTV algorithms (FBX6= based on PICNIC, FBX7= based on PICNIC and Eagle)
FE	Front End
Field	Each interlaced broadcast FRAME is composed of two Fields, each Field consists of either Odd or Even lines
FILAMENT	Filament of CRT
FLASH	FLASH memory
FM	Field Memory / Frequency Modulation
FM Radio	Audio receiver which can receive the FM Band 87.5 - 108 MHz
FMR	FM Radio
Frame	A complete TV picture comprising of all lines (625/525)
FRAMEDRIVE -	Differential frame (vertical) drive signal (negative)
FRAMEDRIVE+	Differential frame (vertical) drive signal (positive)
FRC	Frame Rate Converter
FRONT-DETECT	Control line for detection of headphone insertion, Service Mode jumper, power failure detection.
FRONT-Y_CVBS	Front input luminance or CVBS (SVHS)
G	Green
Gb/s	Giga bits per second
H	H_sync to the module
H_2FH	Horizontal sync input for the 2fH source.
H_A50	Horizontal Acquisition 1fH: horizontal sync pulse coming out of the HIP
H_D100	Horizontal Drive 2fH: horizontal sync pulse coming out of the feature-box
H_DRIVE	Horizontal Drive
H_FLYBACK	Horizontal Flayback
H_OUT	H_sync output of the module
H_OUT	Horizontal Output pulse
HA	Horizontal Acquisition: horizontal sync pulse coming out of the BOCMA
HD	High Definition
HEADPHONE-L	Stereo headphone (Left) signal output.
HEADPHONE-R	Stereo headphone (Right) signal output.
HFB	Horizontal Flyback Pulse: horizontal sync pulse from large signal deflection
HP	HeadPhone
HW	Hardware
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus (same as IIC)
I2S	Integrated IC Sound bus
IC	Integrated Circuit
IDRIVE-	Vertical drive -
IDRIVE+	Vertical drive +
IF	Intermediate Frequency
IF-TER	IF signal from main tuner
IIC	Integrated IC bus (same as I2C)
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
IO	In/Out
IR	Infra Red
IROM	Internal ROM (inside uP)
IRQ	Interrupt ReQuest
ITV	Institutional TV
JTAG	Joint Test Action Group. Definition for a standardised serial test interface
KEYB	Front panel keyboard
KEYBOARD	Input line: carries the voltage value of the corresponding tact switch on TOP-control or FRONT-control keypad
L	Left audio channel

Abbreviation	Description
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
Last Status	The settings last chosen by the customer and read and stored in RAM or in the NVM. They are called at startup of the set to configure it according to the customer's preferences
LATAM	Latin America
LCD	Liquid Crystal Display
L-CL_VLOUT	REAR CINCH stereo output
LED	Light Emitting Diode
LFE	Low Frequency Enhancement audio channel
L-FRONT-IN	EXT3 stereo input
LIGHT-SENSOR	Ambient light intensity signal.
LINE DRIVE	Line drive signal (for the Line transistor)
LINEDRIVE1	Horizontal (line) deflection drive signal.
LNA	Low Noise Adapter / Low Noise Amplifier
LOT	Line Output Transformer
LPD	LG.Philips Displays
LS	Loudspeaker
Ls, Rs	Left surround and Right surround channel (audio)
LSP	Large signal panel
Lt, Rt	Left total and Right total in case of a Dolby ProLogic encoded signal (audio)
LTI	Luminance Transient Improvement
LTP	Luminance Transient Processor
LUT	Look Up Table
LVDS	Low Voltage Differential Signalling, data transmission system for high speed and low EMI communication.
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
Mb/s	Mega bits per second
MCS	Multi Channel Sound: refers to Dolby Pro Logic Surround in A02 ADOC
MDO	Mode control data output
MIPS	Microprocessor without Interlocked Pipeline-Stages. A RISC-based microprocessor.
Mips	Million instructions per second
MMI	Multi Media Interface
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MPEG	Motion Pictures Experts Group
MPIF	Multi Platform InterFace (Part of Salsa chipset, sister-chip of ADOC IC)
MPIP	Multi Picture in Picture: commercial feature showing several frozen or moving pips
MPX	MultiPleX
MSP	Multi-standard Sound Processor: ITT sound decoder
MUTE	MUTE Line
NAFTA	North American Free Trade Area (NAFTA & USA are used interchangeable)
NC	Not Connected
NDF	No vertical Deflection: vertical fly back protection
NHF	No Horizontal deflection: horizontal fly back protection
NICAM	Near Instantaneously Companded Audio Multiplexing. This is a digital sound system, mainly used in Europe.
NTC	Negative Temperature Coefficient, non-linear resistor
NTSC	National Television Standard Committee. Colour system mainly used in North America and Japan. Colour carrier NTSC M/N= 3.579545 MHz, NTSC 4.43= 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)
NVM	Non Volatile Memory: IC containing data such as alignments, stations
O/C	Open Circuit
OB	Option Byte
OC	Open Circuit
ON/OFF LED	On/Off control signal for the LED
ON/STBY	On/Standby
ON-OFF-LED	Active-LOW control line. Logic LOW = red LED on, HIGH = red LED off.
OP	Option Byte
OSD	On Screen Display
P50	Project 50: communication protocol between TV and peripherals
PAL	Phase Alternating Line. Colour system mainly used in West Europe (colour carrier= 4.433619 MHz) and South America (colour carrier PAL M= 3.575612 MHz and PAL N= 3.582056 MHz)
PC	Personal Computer
PCB	Printed Circuit Board (same as "PWB")
PCM	Pulse Code Modulation
PILOT	Pilot Signal

Abbreviation	Description
PIP	Picture In Picture
PLL	Phase Locked Loop. Used for e.g. FST tuning systems. The customer can give directly the desired frequency
POR	Power On Reset, signal to reset the microprocessor
POR_FLASH	Signal that informs the micro controller (painter) that set will switch off
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.
PTC	Positive Temperature Coefficient, non linear resistor
PTP	Picture Tube Panel
PWB	Printed Wiring Board (same as "PCB")
PWM	Pulse Width Modulation
QSS	Quasi Split Sound
R	Right audio channel
R	Red
RAM	Random Access Memory
RC	Remote Control transmitter
RC5	Remote Control system 5, the signal from the remote control
RC5 / RC6	Signal protocol from the remote control receiver
RDS	Radio Data System
RESET	RESET signal
RF	Real Flat / Radio Frequency
RGB	Red, Green, and Blue. The primary colour signals for TV. By mixing levels of R,G, and B, all colours (Y/C) are reproduced.
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync
RISC	Reduced Instructions Set Computer
RMS	Root Mean Square value
ROM	Read Only Memory
S	Surround channel or mono surround channel (audio)
S/C	Short Circuit
S/PDIF	Sony Philips Digital InterFace
SALSA	System Application for Low Segment of Analogue TV
SAM	Service Alignment Mode
SAP	Second Audio Program
SAW	Surface Acoustics Wave
SC	SandCastle: two-level pulse derived from sync signals / SCART
SCART	Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televisieurs
SCAVEM	Scan Velocity Modulation
SCL	Serial Clock I2C
SCL-F	CLock Signal on Fast I2C bus
SD	Standard Definition
SDA	Serial Data I2C
SDA-F	Data Signal on Fast I2C bus
SDAM	Service Default / Alignment Mode
SDRAM	Synchronous DRAM
SECAM	SEequence Couleur Avec Memoire: Colour system mainly used in France and East Europe. Colour carriers= 4.406250 MHz and 4.250000 MHz
SEL	Control signal
SIF	Sound Intermediate Frequency
SIMM	Single In-line Memory Module: 80-fold connector between LSP and SSB
SL	Audio Surround Left
SLDP	Smart Local Dooming Prevention (HW and SW)
SMC	Surface Mounted Components
SMPS	Switched Mode Power Supply
SND	SouND
SNERT	Synchronous No parity Eight bit Reception and Transmit
SOG	Sync On Green
SOPS	Self Oscillating Power Supply
SOUND-ENABLE	Control line to do hardware mute or un-mute of loudspeakers.
SR	Audio Surround Right
SRAM	Static RAM
SS	Small Screen
ST_BY	Standby
STANDBY (POR)	Signal coming from Main Supply informing the supply is switching off
STATUS	Status signal from pin 8 on SCART connector
STBY	Standby
SURR	Surround (mono) signal
SVHS	Super Video Home System
SW	Software / Subwoofer
SW1	Switch 1
TBD	To Be Defined

Abbreviation	Description
THD	Total Harmonic Distortion
TILT	PWM Output signal (variable DC level) to control the picture tilt from the DOP block of the ADOC.
Trinorma	Video standard, combination of PAL N, PAL M, NTSC M
TXT	Teletext
TXTSW	Teletext switch
U_100	U from Feature Box
UART	Universal Asynchronous Receiver Transmitter
UBE	Ultra Bass Enhancement
uC	Micro controller
UI	User Interface
UOC	Ultimate One Chip
uP	Microprocessor
UV	Colour difference signals
V	V_sync
V_100	V from Feature Box
V_2FH	Vertical sync input for the 2fH source.
V_A50	Vertical Acquisition 1fH
V_AMP	Vertical Amplitude DAC output
V_BAT	Main supply for deflection (usually 141 V)
V_D100	Vertical Drive 2fH: vertical sync pulse from deflection
V_DNEG	One of the symmetrical drive signals for the DC frame output stage.
V_DPOS	One of the symmetrical drive signals for the DC frame output stage.
V_OSD	Vertical OSD
VA	Vertical Acquisition
VBI	Vertical Blank Interval
V-chip	Violence chip
VCR	Video Cassette Recorder
VD	Vertical Drive: vertical sync pulse coming from the feature box
VDS	Virtual Dolby Surround
VERT	Vertical Output pulse
VESA	Video Electronics Standards Association
VGA	Video Graphics Array: 640x480 (4:3)
VGND	Video ground
VGUARD	Vertical guard voltage
VIF	Video Intermediate Frequency
VL	Variable Level out: processed audio output toward external amplifier
VMEM	Voltage supplied for EEPROM
VMICRO	Power supply for micro controller
VOL	Volume
VSYNC	Pulse derived of 530 s-circuit behind the HOP, to vertically synchronize the Painter
WD	Watch Dog
WE-NVM	NVM write enable control line.
WS	Wide Screen
WSS	Wide Screen Signaling, used by broadcasters to transmit e.g. PALPLUS and Aspect Ratio
WST	World System Teletext
WXGA	1280x768 (15:9)
WYSIWYR	What You See is What You Record: record selection that follows main picture and sound
XGA	Extended Graphics Array: 1024x768 (4:3)
XTAL	Quartz crystal
Y	Luminance signal
YC (or Y/C)	Luminance (Y) and Chrominance (C) signal (analogue video encoding format)
YPbPr	Component video (Y= Luminance, Pb/ Pr= Colour difference signals)
YUV	Component video

9.11 IC Data Sheets

This section shows the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of "memory" and "logic" ICs). This is not applicable to this manual.

10. Spare Parts List

Large Signal Panel [A]

Various

0080	4822 492 70789	Transistor clamp
0136	3104 301 24181	Spring for Bracket
0137	3104 301 24181	Spring for Bracket
0138	4822 255 41371	Transistor clamp
0139	4822 492 62076	Transistor clamp
0261	3104 304 10661	Cable clamp
0262	3104 304 10722	Cable clamp
0320	4822 255 41371	Transistor clamp
0341	4822 492 70788	IC clamp
0389	4822 492 70789	Transistor clamp
0395	4822 492 70789	Transistor clamp
0396	4822 492 70789	Transistor clamp
1205	2422 025 17242	Connector 80p f
1417	4822 265 20723	Connector 2p m
1424	2422 025 11244	Connector 7p m
1491	4822 267 10973	Connector 1p m
1498	2422 025 04849	Connector 2p m
1499	2422 025 04849	Connector 2p m
1501	4822 070 35002	Fuse 5A
1502	4822 267 10774	Connector 2p m Rd
1503	4822 070 12502	Fuse 2.5A
1505	2422 025 16374	Connector 2p m
1511	4822 265 11253	Fuse holder 2p
1512	4822 265 11253	Fuse holder 2p
1550	2422 132 07411	Relay 1p 5V 5A
1590	4822 252 60151	Sparkgap dsp501
1591	4822 252 60151	Sparkgap dsp501
1601	2422 086 10919	Fuse 65V 125mA
1620	4822 267 10735	Connector 3p m
1625	2422 025 16382	Connector 3p m
1735	4822 267 10565	Connector 4p
1901	4822 267 10771	Socket 2 x SCART
1902	4822 267 10982	Connector 2p
1936	2422 025 12485	Connector 11p m
1940	2422 025 12485	Connector 11p m
1943	4822 267 10748	Connector 3p m
1945	4822 267 10735	Connector 3p m
1947	4822 267 10734	Connector 5p m
8000	3104 311 03272	Cable 640mm EHT
8193	4822 320 20216	Focus cable 364 mm
8194	4822 320 20189	Cable HT-focus 44cm Rd
8417	3104 311 04561	Cable 2p3/400/2p3
8424	3104 311 02991	Cable 7p/560/7p Wh
8625	3104 311 03101	Cable 3p/560/3p Bk
8625	3104 311 06261	Cable 2p/560/2p3 HR BK INS
8936	3104 311 04121	Cable 11p/680/11p INS
8936	4822 320 12514	Cable 11p 680mm
8940	3104 311 01161	Cable 11p/340/11p Bk
8940	4822 323 10458	Cable 11p 480mm HR WH

⊣⊢

2100	4822 126 13841	1nF 20% 250V
2101	4822 121 51598	2.2nF 5% 400V
2102	4822 124 40248	10μF 20% 63V
2103	2020 552 94427	100pF 5% 50v 0603
2104	4822 123 14025	2200μF 20% 16V
2105	2020 552 94427	100pF 5% 50v 0603
2107	4822 121 43855	3.3nF 5% 400V
2108	4822 121 70162	10nF 5% 400V
2109	4822 126 14472	1μF 10% 10V 0805
2110	4822 126 14472	1μF 10% 10V 0805
2111	4822 121 43526	47nF 5% 250V
2112	5322 126 11583	10nF 10% 50V 0603
2115	4822 124 40764	22μF 100 V
2116	4822 126 13682	100pF 5% 1kV
2118	4822 124 80061	1000μF 20% 25V
2119	4822 123 14025	2200μF 20% 16V
2120	4822 126 13862	1.5nF 10% 2kV
2126	4822 123 14025	2200μF 20% 16V
2130	5322 126 11583	10nF 10% 50V 0603
2131	4822 126 13881	470pF 5% 50V
2132	4822 126 10206	2.2nF 10% 500V
2140	4822 124 40248	10μF 20% 63V
2141	4822 124 40248	10μF 20% 63V
2143	4822 126 10206	2.2nF 10% 500V
2144	4822 126 14472	1μF 10% 10V 0805
2145	4822 126 13881	470pF 5% 50V
2147	3198 017 31530	15nF 20% 50V 0603
2148	4822 126 13599	3.3nF 10% 500V
2149	4822 126 14472	1μF 10% 10V 0805
2150	5322 126 11583	10nF 10% 50V 0603
2153	5322 126 11582	6.8nF 10% 63V
2154	4822 126 14549	33nF 16V 0603
2161	2020 558 90556	680pF 10%b 1kV
2161	4822 126 14152	680pF 10% 1kV
2163	2222 338 22104	100nF 20% 275V
2200	4822 124 40248	10μF 20% 63V
2201	4822 126 13879	220nF 20% 16V
2202	4822 126 13473	220nF 80-20% 50V
2203	4822 124 41584	100μF 20% 10V
2400	4822 124 11936	47μF 20% 160V
2401	4822 121 42077	6.8nF 10% 400V
2402	4822 124 12373	47μF 20% 250V
2403	2238 916 15641	22nF 10% 25V 0603
2404	2238 916 15641	22nF 10% 25V 0603
2405	4822 126 13841	1nF 20% 250V
2412	3198 024 44730	47nF 50V 0603
2413	4822 124 12255	10μF 20% 50V
2414	3198 024 44730	47nF 50V 0603
2415	4822 126 13883	220pF 5% 50V
2417	4822 126 14076	220nF 25V. 20%
2419	4822 126 14237	470pF 10% 2kV
2420	4822 121 70581	1.5nF 5% 2kV
2420	4822 121 70594	1nF 5% 2kV
2421	2038 301 00312	1.2μF 5% 250V
2421	4822 121 42634	560nF 5% 250V
2425	4822 121 10526	9.1nF 5% 2kV
2425	4822 121 70435	10nF 5% 2kV
2426	4822 121 10653	22nF 5% 630V
2430	4822 126 10206	2.2nF 10% 500V
2431	4822 126 10206	2.2nF 10% 500V
2433	2022 333 00087	510nF 5% 250V
2433	2022 333 00163	360nF 5% 250V
2440	2020 552 96448	1μF 10% 16V
2443	9965 000 09661	470pF 50V 10%
2448	5322 122 32268	470pF 5% 63V
2450	4822 121 42408	220nF 10% 50V
2450	5322 121 42578	100nF 5% 250V
2451	2020 012 93757	1000μF 20% 10V
2454	3198 017 31530	15nF 20% 50V 0603
2455	5322 126 11578	1nF 10% 50V 0603
2457	4822 126 13188	15nF 5% 63V
2458	4822 126 14241	330pF 50V 0603
2460	4822 124 81144	1000μF 16V
2461	4822 122 31169	1.5nF 10% 500V
2461	4822 126 11524	1.5nF 10% 1kV
2462	4822 124 11767	470μF 20% 25V
2463	4822 122 31177	470pF 10% 500V
2464	4822 124 11767	470μF 20% 25V
2465	4822 122 31177	470pF 10% 500V
2466	2238 586 59812	100nF 20-80% 50V 0603
2468	4822 122 31177	470pF 10% 500V
2480	5322 126 11582	6.8nF 10% 63V
2482	3198 017 34730	47nF 16V 0603
2483	3198 017 31530	15nF 20% 50V 0603
2490	4822 124 41584	100μF 20% 10V
2491	4822 124 81151	22μF 50V
2492	4822 124 41584	100μF 20% 10V
2494	2238 780 15654	220nF 10% 16V
2495	2238 780 15654	220nF 10% 16V
2496	2238 586 59812	100nF 20-80% 50V 0603
2497	4822 126 12105	33nF 5% 50V
2498	2020 552 96448	1μF 10% 16V
2499	5322 126 11579	3.3nF 10% 63V
2501	4822 126 13449	1nF 10% 2KV
2501	4822 126 14053	1nF 10% 2kV
2503	5322 121 42489	33nF 5% 250V
2504	2238 916 15641	22nF 10% 25V 0603
2505	2020 554 90169	470pF 20% 250V
2507	2222 338 22474	470nF 20% 275V
2508	4822 124 11913	22nF 20% 275V
2509	4822 124 11913	22nF 20% 275V
2510	4822 126 12263	220pF 10% 2kV
2512	4822 124 12056	1000μF 20% 35V
2513	4822 126 13881	470pF 5% 50V
2514	4822 126 14238	2.2nF 50V 0603
2515	4822 124 80096	47μF 200V
2516	2222 057 36221	220μF 20% 400V 057
2518	4822 122 31211	100pF 10% 500V
2519	4822 126 10206	2.2nF 10% 500V
2524	5322 126 11583	10nF 10% 50V 0603
2525	4822 126 14247	1.5nF 50V 0603
2526	2020 558 90571	2.2nF 10% 1kV
2527	4822 126 14237	470pF 10% 2kV
2528	4822 126 14472	1μF 10% 10V 0805
2530	4822 126 14472	1μF 10% 10V 0805
2531	4822 122 31175	1nF 10% 500V
2532	4822 126 14472	1μF 10% 10V 0805
2533	2020 557 90732	4.7nF 10% 250V
2535	4822 126 13193	4.7nF 10% 63V
2537	4822 124 11913	22nF 20% 275V
2538	4822 122 33177	10nF 20% 50V
2540	4822 124 21913	1μF 20% 63V
2541	4822 122 31211	100pF 10% 500V
2544	4822 126 14238	2.2nF 50V 0603
2547	2222 338 22104	100nF 20% 275V
2601	2238 586 59812	100nF 20-80% 50V 0603
2603	4822 126 13883	220pF 5% 50V
2604	4822 126 13473	220nF 80-20% 50V
2605	4822 126 13883	220pF 5% 50V
2620	4822 126 13473	220nF 80-20% 50V
2621	2238 586 59812	100nF 20-80% 50V 0603
2622	4822 124 40255	100μF 20% 63V
2623	4822 126 14238	2.2nF 50V 0603
2624	4822 121 51252	470nF 5% 63V
2625	4822 121 51252	470nF 5% 63V
2627	5322 124 40641	10μF 20% 100V
2628	4822 124 40255	100μF 20% 63V
2630	4822 126 14491	2.2μF -20+80% 10V 0805
2631	4822 126 14491	2.2μF -20+80% 10V 0805
2633	5322 126 11579	3.3nF 10% 63V
2635	2238 586 59812	100nF 20-80% 50V 0603
2642	4822 124 40255	100μF 20% 63V
2653	2238 586 15628	2.7nF 10% 50V 0603
2653	5322 126 11579	3.3nF 10% 63V
2656	2238 916 15641	22nF 10% 25V 0603
2657	2238 916 15641	22nF 10% 25V 0603
2659	2238 916 15641	22nF 10% 25V 0603
2660	5322 126 11578	1nF 10% 50V 0603
2701	4822 126 14043	1μF 20% 16V
2702	3198 016 31020	1nF 10% 25V 0603
2703	4822 126 14043	1μF 20% 16V
2704	3198 016 31020	1nF 10% 25V 0603
2707	4822 126 14043	1μF 20% 16V
2708	4822 124 11767	470μF 20% 25V
2709	3198 026 51020	1000μF 50V 20%
2710	4822 126 14585	100nF 10% 50V
2711	4822 124 80061	1000μF 20% 25V
2712	3198 017 34730	47nF 16V 0603
2713	3198 017 34730	47nF 16V 0603
2714	4822 124 80061	1000μF 20% 25V
2715	3198 017 34730	47nF 16V 0603
2716	3198 017 34730	47nF 16V 0603
2722	4822 124 40255	100μF 20% 63V
2914	4822 124 40248	10μF 20% 63V
2915	4822 124 40248	10μF 20% 63V
2918	4822 126 14585	100nF 10% 50V
2940	4822 124 41584	100μF 20% 10V
2941	4822 126 14585	100nF 10% 50V
2942	4822 126 14585	100nF 10% 50V
2943	4822 126 14585	100nF 10% 50V
2945	4822 126 14491	2.2μF -20+80% 10V 0805
2946	4822 126 14491	2.2μF -20+80% 10V 0805
2947	4822 124 40769	4.7μF 20% 100V
2950	5322 126 11583	10nF 10% 50V 0603
2951	5322 126 11583	10nF 10% 50V 0603
2987	5322 122 31863	330pF 5% 63V
2989	5322 122 31863	330pF 5% 63V
2990	5322 122 31863	330pF 5% 63V
2991	4822 051 20333	33kΩ 5% 0.1W
2991	5322 122 32531	100pF 5% 50V
2992	5322 122 31863	330pF 5% 63V
2993	4822 051 20333	33kΩ 5% 0.1W
2993	5322 122 32531	100pF 5% 50V
2994	5322 122 31863	330pF 5% 63V
2995	5322 122 31863	330pF 5% 63V
2996	5322 122 31863	330pF 5% 63V
2997	5322 122 31863	330pF 5% 63V
2998	4822 051 20333	33kΩ 5% 0.1W
2998	5322 122 32531	100pF 5% 50V
2999	4822 051 20333	33kΩ 5% 0.1W
2999	5322 122 32531	100pF 5% 50V

-WW-

3101	4822 053 20475	4.7MΩ 5% 0.25W
3102	4822 050 21002	1kΩ 1% 0.6W
3103	4822 050 21002	1kΩ 1% 0.6W
3104	4822 116 52195	47Ω 5% 0.5W
3105	4822 050 11002	1kΩ 1% 0.4W
3106	4822 116 52256	2.2kΩ 5% 0.5W
3107	4822 116 52256	2.2kΩ 5% 0.5W
3108	2122 101 01363	2.2Ω 5%
3111	4822 053 10152	1.5kΩ 5% 1W
3113	4822 116 52186	22Ω 5% 0.5W
3114	4822 116 52219	330Ω 5% 0.5W
3115	4822 116 52257	22kΩ 5% 0.5W
3116	4822 116 52257	22kΩ 5% 0.5W
3117	4822 116 52195	47Ω 5% 0.5W

3118	2122 101 01363	2.2Ω 5%
3120	4822 051 20109	10Ω 5% 0.1W
3123	4822 116 52176	10Ω 5% 0.5W
3124	4822 116 52199	68Ω 5% 0.5W
3125	4822 116 52182	15Ω 5% 0.5W
3126	4822 050 21003	10kΩ 1% 0.6W
3127	4822 116 52289	5.6kΩ 5% 0.5W
3130	4822 051 30479	47Ω 5% 0.062W
3131	4822 051 20471	470Ω 5% 0.1W
3132	4822 051 20479	47Ω 5% 0.1W
3133	4822 117 12925	47kΩ 1% 0.063W 0603
3134	4822 051 30102	1kΩ 5% 0.062W
3135	4822 051 30101	100Ω 5% 0.062W
3136	4822 051 30109	10Ω 5% 0.062W
3137	4822 050 24702	4.7kΩ 1% 0.6W
3138	4822 051 20105	1MΩ 5% 0.1W
3140	4822 051 20223	22kΩ 5% 0.1W
3141	4822 116 52263	2.7kΩ 5% 0.5W
3142	4822 051 30332	3.3kΩ 5% 0.062W
3143	4822 051 30101	100Ω 5% 0.062W
3144	4822 053 10221	220Ω 5% 1W
3150	4822 117 11373	100Ω 1% 0805
3151	4822 051 30109	10Ω 5% 0.062W
3152	4822 051 30102	1kΩ 5% 0.062W
3153	4822 051 20472	4.7kΩ 5% 0.1W
3155	4822 051 30101	100Ω 5% 0.062W
3156	5322 117 13017	100Ω 1% 0.063W 0603
3157	4822 051 30103	10kΩ 5% 0.062W
3158	2322 704 61801	180Ω 1% 0603
3158	5322 117 13061	180Ω 1% 0.063W 0603
3159	4822 051 30103	10kΩ 5% 0.062W
3160	4822 051 30102	1kΩ 5% 0.062W
3161	4822 052 10101	100Ω 5% 0.33W
3164	4822 117 13632	100kΩ 1% 0.62W 0603
3165	2322 704 61801	180Ω 1% 0603
3165	5322 117 13061	180Ω 1% 0.063W 0603
3168	4822 051 20472	4.7kΩ 5% 0.1W
3171	4822 116 52297	68kΩ 5% 0.5W
3172	4822 116 52297	68kΩ 5% 0.5W
3200	4822 051 20229	22Ω 5% 0.1W
3201	4822 051 20229	22Ω 5% 0.1W
3250	4822 117 10833	10kΩ 1% 0.1W
3261	4822 117 11373	100Ω 1% 0805
3262	4822 117 11373	100Ω 1% 0805
3400	4822 052 11108	1Ω 5% 0.5W
3401	4822 053 12279	27R00 5% 3W
3402	4822 053 10121	120Ω 5% 1W
3403	4822 116 52175	100Ω 5% 0.5W
3404	4822 051 30471	470Ω 5% 0.062W
3406	4822 117 11373	100Ω 1% 0805
3407	4822 051 30103	10kΩ 5% 0.062W
3409	4822 050 11002	1kΩ 1% 0.4W
3410	4822 051 20479	47Ω 5% 0.1W
3411	2122 101 02111	39Ω 5% 0,5W
3412	4822 117 11817	1.2kΩ 1% 0.062W
3414	4822 051 30331	330Ω 5% 0.062W
3415	3198 012 31590	15Ω 5% 3W
3417	4822 116 52176	10Ω 5% 0.5W
3418	4822 050 25603	56kΩ 1% 0.6W
3419	4822 051 30474	470kΩ 5% 0.062W
3420	4822 051 30332	3.3kΩ 5% 0.062W
3421	4822 051 30474	470kΩ 5% 0.062W
3422	4822 051 30332	3.3kΩ 5% 0.062W
3423	4822 053 10688	6.8Ω 5% 1W
3425	4822 116 52176	10Ω 5% 0.5W
3426	4822 116 52176	10Ω 5% 0.5W
3427	4822 051 30683	68kΩ 5% 0.062W
3427	4822 117 13632	100kΩ 1% 0.62W 0603
3428	4822 051 30684	680kΩ 5% 0.062W
3429	4822 051 30103	10kΩ 5% 0.062W
3429	4822 051 30223	22kΩ 5% 0.062W
3430	4822 051 30123	12kΩ 5% 0.062W
3430	4822 051 30223	22kΩ 5% 0.062W
3431	2306 207 03151	150Ω 5% 0.5W
3440	4822 051 30102	1kΩ 5% 0.062W
3441	4822 051 30223	22kΩ 5% 0.062W
3442	4822 051 30474	470kΩ 5% 0.062W
3443	4822 051 30684	680kΩ 5% 0.062W
3447	4822 117 11373	100Ω 1% 0805
3449	4822 052 10101	100Ω 5% 0.33W
3450	4822 050 21003	10kΩ 1% 0.6W
3451	4822 050 21003	10kΩ 1% 0.6W
3454	4822 051 20108	1Ω 5% 0.1W
3455	4822 117 12902	8.2kΩ 1% 0.063W 0603
3455	5322 117 13056	8.2kΩ 1% 0.063W 0603
3456	4822 117 12903	1.8kΩ 1% 0.063W 0603
3457	4822 051 30152	1.5kΩ 5% 0.062W
3458	4822 051 30471	470Ω 5% 0.062W
3459	4822 051 30272	2.7kΩ 5% 0.062W
3460	4822 052 10108	1Ω 5% 0.33W
3461	4822 052 10108	1Ω 5% 0.33W
3462	4822 052 11108	1Ω 5% 0.5W
3463	4822 052 11108	1Ω 5% 0.5W
3464	4822 052 11108	1Ω 5% 0.5W
3465	4822 052 11108	1Ω 5% 0.5W
3466	4822 051 30472	4.7kΩ 5% 0.062W
3467	4822 117 13632	100kΩ 1% 0.62W 0603
3472	4822 051 30393	39kΩ 5% 0.062W
3474	4822 051 30563	56kΩ 5% 0.062W
3475	4822 051 30472	4.7kΩ 5% 0.062W
3476	4822 116 83874	220kΩ 5% 0.5W
3478	4822 116 52175	100Ω 5% 0.5W
3479	4822 052 10478	4.7Ω 5% 0.33W
3480	4822 052 10478	4.7Ω 5% 0.33W
3480	4822 052 10688	6.8Ω 5% 0.33W
3481	2322 750 61001	100Ω 5% 1206
3482	4822 051 30221	220Ω 5% 0.062W
3483	4822 117 12903	1.8kΩ 1% 0.063W 0603
3485	4822 051 30471	470Ω 5% 0.062W
3486	2322 704 67502	7.5kΩ 1% 0,5W
3487	5322 117 13056	8.2kΩ 1% 0.063W 0603
3488	4822 050 21005	1MΩ 1% 0.6W
3489	4822 051 30103	10kΩ 5% 0.062W
3490	4822 051 30332	3.3kΩ 5% 0.062W
3491	4822 117 12925	47kΩ 1% 0.063W 0603
3492	4822 116 52175	100Ω 5% 0.5W
3493	4822 050 21504	150kΩ 1% 0.6W
3495	4822 050 21503	15kΩ 1% 0.6W
3496	4822 051 30272	2.7kΩ 5% 0.062W
3497	4822 051 30333	33kΩ 5% 0.062W
3501	2120 103 90057	100Ω 20% 0.5W
3504	4822 051 30222	2.2kΩ 5% 0.062W
3505	4822 116 52257	22kΩ 5% 0.5W
3506	4822 051 30562	5.6kΩ 5% 0.063W 0603
3507	4822 050 21604	160kΩ 1% 0.6W
3508	4822 116 52182	15Ω 5% 0.5W
3509	2122 550 00158	VDR 1mA 612V
3510	5322 117 12487	1kΩ 1% 0.125W
3511	4822 053 11222	2.2kΩ 5% 2W
3512	4822 117 12891	220kΩ 1% 0.063W 0603
3513	4822 116 52272	330k 5% 0.5W
3514	2322 193 53397	0.39Ω 5% 0.6W
3515	2322 193 53397	0.39Ω 5% 0.6W
3517	4822 117 10834	47kΩ 1% 0.1W
3518	4822 116 52234	100kΩ 5% 0,5W
3519	4822 051 30102	1kΩ 5% 0.062W
3520	4822 053 11333	33kΩ 5% 2W
3521	4822 053 21155	1.5Ω 5% 0.5W
3522	4822 117 11507	6.8kΩ 1% 0.1W
3523	4822 051 20105	1MΩ 5% 0.1W
3524	4822 051 30333	33kΩ 5% 0.062W
3525	4822 051 30479	47Ω 5% 0.062W
3527	4822 117 11951	2kΩ 1% 0.1W
3528	4822 051 30103	10kΩ 5% 0.062W
3529	4822 051 30472	4.7kΩ 5% 0.062W
3530	4822 051 30102	1kΩ 5% 0.062W
3531	4822 117 11507	6.8kΩ 1% 0.1W
3532	4822 117 12925	47kΩ 1% 0.063W 0603
3533	4822 116 52182	15Ω 5% 0.5W
3534	4822 117 12925	47kΩ 1% 0.063W 0603
3535	4822 051 30479	47Ω 5% 0.062W
3536	4822 051 30152	1.5kΩ 5% 0.062W
3537	4822 052 10102	1kΩ 5% 0.33W
3540	4822 050 23303	33k 1% 0.6W
3541	4822 116 52186	22Ω 5% 0.5W
3543	4822 050 24708	4.7Ω 1% 0.6W
3547	4822 051 30008	Jumper 0603
3549	4822 051 30393	39kΩ 5% 0.062W
3550	2122 663 00018	PTC 4.7Ω 20%
3552	4822 051 30222	2.2kΩ 5% 0.062W
3553	4822 051 30103	10kΩ 5% 0.062W
3610	4822 051 30223	22kΩ 5% 0.062W
3611	4822 051 30222	2.2kΩ 5% 0.062W
3620	4822 050 21808	1.8Ω 1% 0,6W
3620	4822 116 80176	1Ω 5% 0.5W
3621	4822 116 80176	1Ω 5% 0.5W
3622	4822 116 81154	2.2Ω 5% 0.5W
3622	5322 116 53564	3.3Ω 5% 0.5W
3623	4822 116 52251	18kΩ 5% 0.5W
3624	4822 052 10158	1.5Ω 5% 0.33W
3625	4822 116 52206	120Ω 5% 0.5W
3625	4822 116 52219	330Ω 5% 0.5W
3626	4822 116 52175	100Ω 5% 0.5W
3626	4822 116 52219	330Ω 5% 0.5W
3627	4822 051 20223	22kΩ 5% 0.1W
3630	4822 051 30333	33kΩ 5% 0.062W
3631	4822 051 30222	2.2kΩ 5% 0.062W
3632	4822 051 30393	39kΩ 5% 0.062W
3633	4822 051 30563	56kΩ 5% 0.062W
3634	4822 116 83882	39kΩ 5% 0.5W
3635	4822 116 52219	330Ω 5% 0.5W
3636	4822 051 30223	22kΩ 5% 0.062W
3637	4822 051 30103	10kΩ 5% 0.062W
3638	4822 051 30474	470kΩ 5% 0.062W
3639	4822 051 30563	56kΩ 5% 0.062W
3640	4822 051 30222	2.2kΩ 5% 0.062W
3641	4822 116 83883	470Ω 5% 0.5W
3642	4822 101 11193	47kΩ 30% 0.1W
3643	4822 051 30334	330kΩ 5% 0.062W
3644	4822 051 30221	220Ω 5% 0.062W
3645	4822 116 52245	150kΩ 5% 0.5W
3646	4822 117 12925	47kΩ 1% 0.063W 0603
3647	4822 051 20228	2.2Ω 5% 0.1W
3652	4822 051 20479	47Ω 5% 0.1W
3653	4822 051 20223	22kΩ 5% 0.1W
3655	4822 051 30123	12kΩ 5% 0.062W
3656	4822 117 11817	1.2kΩ 1% 0.062W
3657	4822 051 30223	22kΩ 5% 0.062W
3658	4822 051 30223	22kΩ 5% 0.062W
3659	4822 051 30222	2.2kΩ 5% 0.062W
3660	4822 051 30562	5.6kΩ 5% 0.063W 0603
3661	4822 116 52226	560Ω 5% 0.5W
3662	4822 051 30152	1.5kΩ 5% 0.062W
3681	4822 116 52207	1.2kΩ 5% 0.5W
3682	4822 117 13632	100kΩ 1% 0.62W 0603
3683	4822 051 30103	10kΩ 5% 0.062W
3684	4822 051 30682	6.8kΩ 5% 0.062W
3685	4822 051 30273	27kΩ 5% 0.062W
3686	4822 051 30563	56kΩ 5% 0.062W
3687	4822 116 52207	1.2kΩ 5% 0.5W
3688	4822 051 20684	680kΩ 5% 0.1W
3690	4822 051 30109	10Ω 5% 0.062W
3701	4822 051 30103	10kΩ 5% 0.062W
3701	4822 117 12925	47kΩ 1% 0.063W 0603
3702	4822 051 30223	22kΩ 5% 0.062W
3703	4822 051 30103	10kΩ 5% 0.062W
3703	4822 117 12925	47kΩ 1% 0.063W 0603
3704	4822 051 30223	22kΩ 5% 0.062W
3707	4822 051 30103	10kΩ 5% 0.062W
3708	4822 117 12925	47kΩ 1% 0.063W 0603
3710	4822 117 12925	47kΩ 1% 0.063W 0603
3711	4822 051 30103	10kΩ 5% 0.062W
3713	2322 702 81828	8.2Ω 5% 0.1W 0603
3714	2322 702 81828	8.2Ω 5% 0.1W 0603
3716	4822 050 21003	10kΩ 1% 0.6W
3719	4822 051 30103	10kΩ 5% 0.062W
3720	4822 052 10108	1Ω 5% 0.33W
3721	4822 052 10108	1Ω 5% 0.33W
3725	4822 116 52251	18kΩ 5% 0.5W
3726	4822 050 21003	10kΩ 1% 0.6W
3904	4822 052 10688	6.8Ω 5% 0.33W
3905	4822 051 30101	100Ω 5% 0.062W
3912	4822 051 30008	Jumper 0603
3928	4822 051 30101	100Ω 5% 0.062W
3929	4822 051 30103	10kΩ 5% 0.062W
3930	4822 051 20561	560Ω 5% 0.1W
3938	4822 117 11373	100Ω 1% 0805
3939	4822 051 30103	10kΩ 5% 0.062W
3940	4822 051 20561	560Ω 5% 0.1W
3941	4822 052 10688	6.8Ω 5% 0.33W
3959	4822 117 10353	150Ω 1% 0.1W
3960	4822 117 10353	150Ω 1% 0.1W
3961	4822 117 10353	150Ω 1% 0.1W
3962	4822 117 10353	150Ω 1% 0.1W
3965	4822 117 10353	150Ω 1% 0.1W
3966	4822 117 10353	150Ω 1% 0.1W
3967	4822 116 52201	75Ω 5% 0.5W
3968	4822 116 52201	75Ω 5% 0.5W
3969	4822 051 20008	Jumper 0805
3969	4822 117 11373	100Ω 1% 0805
3970	4822 051 20008	Jumper 0805
3970	4822 117 11373	100Ω 1% 0805
3971	4822 116 52201	75Ω 5% 0.5W
3972	4822 116 52201	75Ω 5% 0.5W
3973	4822 116 52201	75Ω 5% 0.5W
3974	4822 116 52201	75Ω 5% 0.5W
3975	4822 116 52201	75Ω 5% 0.5W
3976	4822 117 11373	100Ω 1% 0805
3977	4822 051 20008	Jumper 0805
3977	4822 117 11373	100Ω 1% 0805
3978	4822 051 20008	Jumper 0805
3978	4822 117 11373	100Ω 1% 0805
3979	4822 116 52201	75Ω 5% 0.5W
3980	4822 051 20008	Jumper 0805
3980	4822 117 11373	100Ω 1% 0805
3981	4822 051 10102	1kΩ 2% 0.25W
3981	4822 117 10833	10kΩ 1% 0.1W
3982	4822 051 20392	3.9kΩ 5% 0.1W
3982	4822 051 20393	39kΩ 5% 0.1W
3983	4822 116 52175	100Ω 5% 0.5W
3984	4822 051 10102	1kΩ 2% 0.25W
3984	4822 117 10833	10kΩ 1% 0.1W
3985	4822 116 52201	75Ω 5% 0.5W
3986	4822 116 52276	3.9kΩ 5% 0.5W
3986	4822 116 83882	39kΩ 5% 0.5W
3987	4822 116 52175	100Ω 5% 0.5W
3988	4822 051 10102	1kΩ 2% 0.25W
3988	4822 117 11373	100Ω 1% 0805
3989	4822 050 11002	1kΩ 1% 0.4W
3989	4822 116 52175	100Ω 5% 0.5W
3990	4822 117 10353	150Ω 1% 0.1W
3991	4822 117 10353	150Ω 1% 0.1W

3992	4822 117 10353	150Ω 1% 0.1W
3993	4822 116 83868	150Ω 5% 0.5W
3994	4822 051 10102	1kΩ 2% 0.25W
3994	4822 117 11373	100Ω 1% 0805
3995	4822 051 10102	1kΩ 2% 0.25W
3995	4822 117 11373	100Ω 1% 0805
3996	4822 117 10353	150Ω 1% 0.1W
3997	4822 117 10353	150Ω 1% 0.1W
4xxx	4822 051 30008	Jumper 0603
9xxx	4822 051 20008	Jumper 0805
9xxx	4822 051 30008	Jumper 0603

—∿—

5100	3104 308 20431	Transformer BS25126-03
5101	4822 526 10704	Bead 45Ω at 50MHz
5102	2422 535 94639	10μH 20%
5103	4822 526 10704	Bead 45Ω at 50MHz
5104	4822 157 11411	Bead 83Ω at 100MHz
5105	2422 535 94632	1μH 30%
5106	4822 157 11716	Bead 30Ω at 100MHz
5107	4822 157 11716	Bead 30Ω at 100MHz
5108	4822 526 10704	Bead 45Ω at 50MHz
5110	4822 526 10704	Bead 45Ω at 50MHz
5111	4822 157 11411	Bead 83Ω at 100MHz
5113	4822 157 11411	Bead 83Ω at 100MHz
5130	4822 157 11411	Bead 83Ω at 100MHz
5400	4822 157 11869	33μH 10%
5401	2422 536 00059	12μH 10%
5402	3198 018 21510	150μH 10%
5410	3128 138 39091	Transformer CE165T
5411	4822 157 71097	0.56μH 10%
5421	3104 308 20471	Linearity coil 28"/29"
5421	3104 308 20591	Linearity coil 32"
5422	2422 531 02357	Bridge coil W7132-004Y 29"
5422	4822 146 11137	Bridge coil W7131-003 28"/32"
5423	4822 157 71097	0.56μH 10%
5425	4822 157 11411	Bead 83Ω at 100MHz
5426	4822 157 11411	Bead 83Ω at 100MHz
5430	3104 308 20491	LOT 1392.9014A
5461	4822 157 11411	Bead 83Ω at 100MHz
5463	4822 157 11411	Bead 83Ω at 100MHz
5465	4822 157 11411	Bead 83Ω at 100MHz
5467	4822 157 11411	Bead 83Ω at 100MHz
5469	4822 157 11411	Bead 83Ω at 100MHz
5503	2422 549 44877	Filter 45mH DMF2845H
5505	4822 157 11411	Bead 83Ω at 100MHz
5506	2422 531 02575	Transformer SMT BS30029-01
5506	2422 531 02635	Transformer SMT SS30327-01 B
5507	4822 157 11411	Bead 83Ω at 100MHz
5511	3104 308 20511	Filter mains 40mH
5515	4822 157 11869	33μH 10%
5517	4822 157 11411	Bead 83Ω at 100MHz
5518	4822 526 10704	Bead 45Ω at 50MHz
5519	4822 157 11716	Bead 30Ω at 100MHz
5520	4822 157 11411	Bead 83Ω at 100MHz
5620	4822 157 11771	0.09μH 10%
5621	3104 308 20571	Transf. S13974-03
5901	4822 157 11299	10μH 5%
5902	3198 018 71010	100μF 10%
5903	4822 157 10359	33μH 10%
5904	4822 157 11411	Bead 83Ω at 100MHz

—▷|—

6080	4822 130 11397	BAS316
6082	4822 130 80622	BAT54
6103	4822 130 41601	BYV95A
6104	9340 548 67115	PDZ22B
6105	4822 130 34281	BZX79-B15
6106	3198 010 52290	BZX79-B22
6108	4822 130 80622	BAT54
6109	4822 130 31083	BYW55
6110	4822 130 41487	BYV95C
6111	9322 161 78682	SB360L-7024
6112	4822 130 11551	UDZS10B
6115	4822 130 80622	BAT54
6120	4822 130 30621	1N4148
6121	4822 130 30621	1N4148
6122	3198 010 53980	BZX79-B3V9
6130	4822 130 11596	BYW29EX-200
6132	9322 171 80685	BZX384-B6V8
6133	4822 130 11397	BAS316
6134	4822 130 11397	BAS316
6141	4822 130 11522	UDZ15B
6142	4822 130 80622	BAT54
6144	4822 130 11397	BAS316
6147	4822 130 34278	BZX79-B6V8
6148	5322 130 31938	BYV27-200
6149	4822 130 11397	BAS316
6200	9340 548 71115	PDZ33B
6202	4822 130 11397	BAS316
6400	4822 130 41601	BYV95A
6402	4822 130 11397	BAS316
6405	4822 130 34383	BZX79-B47
6406	4822 130 11397	BAS316
6407	4822 130 11397	BAS316
6408	4822 130 41601	BYV95A
6421	4822 130 10753	BY359X-1500
6422	4822 130 10218	BY229X-800
6442	4822 130 11522	UDZ15B
6455	4822 130 11397	BAS316
6456	5322 130 34337	BAV99
6457	9322 102 64685	UDZ2.7B
6458	3198 020 55680	BZX384-C5V6
6460	4822 130 41487	BYV95C
6462	9340 559 53112	BYW95C-24
6464	9340 559 53112	BYW95C-24
6480	4822 130 31607	RGP10D
6481	4822 130 11522	UDZ15B
6482	4822 130 11397	BAS316
6483	4822 130 80622	BAT54
6493	4822 130 80622	BAT54
6499	4822 130 11551	UDZS10B
6505	4822 130 34281	BZX79-B15
6506	4822 130 80622	BAT54
6509	4822 130 11397	BAS316
6510	4822 130 61219	BZX79-B10
6511	4822 130 11397	BAS316
6512	4822 130 11397	BAS316
6514	5322 130 31932	BZT03-C200
6515	4822 130 33657	BZV85-C6V8
6516	4822 130 11397	BAS316
6517	4822 130 80622	BAT54
6525	3198 010 10640	Bridge cell GBU4K
6530	4822 130 41487	BYV95C
6534	9322 165 72687	DTV1500MFP
6535	4822 130 11572	STPS8H100F
6537	4822 130 11397	BAS316
6538	4822 130 11397	BAS316
6614	4822 130 80622	BAT54
6615	4822 130 11397	BAS316
6616	4822 130 11397	BAS316
6617	4822 130 11397	BAS316
6618	4822 130 11397	BAS316
6619	4822 130 31607	RGP10D
6620	5322 130 31938	BYV27-200
6621	4822 130 31607	RGP10D
6623	4822 130 11397	BAS316
6624	4822 130 11397	BAS316
6625	4822 130 11397	BAS316
6626	4822 130 11397	BAS316
6627	4822 130 11397	BAS316
6901	4822 130 11416	PDZ6.8B
6950	4822 130 11416	PDZ6.8B
6951	4822 130 11416	PDZ6.8B
6953	4822 130 11416	PDZ6.8B
6954	4822 130 11416	PDZ6.8B
6955	4822 130 11416	PDZ6.8B
6956	4822 130 11416	PDZ6.8B
6957	4822 130 11416	PDZ6.8B
6958	4822 130 11416	PDZ6.8B
6959	4822 130 11416	PDZ6.8B
6960	9340 548 61115	PDZ12B
6961	4822 130 11416	PDZ6.8B
6962	4822 130 11416	PDZ6.8B

⊗▭

7100	4822 130 44568	BC557B
7101	4822 130 40981	BC337-25
7102	9322 160 34687	FQPF3N60
7103	9322 149 04682	TCET1102
7130	5322 130 60159	BC846B
7131	4822 130 11336	STP16NE06FP
7132	5322 130 60159	BC846B
7133	4822 130 60373	BC856B
7140	5322 130 60159	BC846B
7141	4822 130 11336	STP16NE06FP
7408	5322 130 44647	BC368
7409	5322 130 60159	BC846B
7421	9340 210 30127	BU2520DX
7440	4822 209 70672	LM358N SEL.
7441	4822 130 60373	BC856B
7442	4822 130 60373	BC856B
7443	5322 130 60159	BC846B
7445	5322 130 60159	BC846B
7450	5322 209 61472	LM393M
7455	4822 209 73852	PMBT2369
7480	4822 130 11417	STP3NB60FP
7482	4822 130 11418	TCDT1102G
7486	5322 130 60159	BC846B
7487	5322 130 60159	BC846B
7501	5322 130 60159	BC846B
7502	4822 130 40959	BC547B
7504	9322 194 20687	STP5NK50ZFP
7506	4822 209 14933	TL431IZ
7507	9322 149 04682	TCET1102
7528	4822 130 40981	BC337-25
7529	4822 130 44461	BC546B
7530	5322 130 60159	BC846B
7611	5322 130 60159	BC846B
7612	5322 130 60159	BC846B
7613	4822 209 81397	TL431CLPST
7614	5322 130 60159	BC846B
7620	4822 209 90009	TDA8177
7641	5322 130 60159	BC846B
7652	5322 130 60159	BC846B
7653	5322 130 60159	BC846B
7654	4822 130 60373	BC856B
7680	4822 209 60956	TDA7052/N2
7681	5322 130 60159	BC846B
7682	5322 130 44647	BC368
7701	9322 166 94682	TDA7495S
7710	5322 130 60159	BC846B
7711	5322 130 60159	BC846B
7901	5322 130 60159	BC846B
7902	5322 130 60159	BC846B
7910	9322 152 53687	LD1086V33
7912	5322 209 86445	LM7805CT

Small Signal Board [B]

Various

1112	2422 549 44369	SAW 38.9MHz K9656L
1113	2422 549 44372	SAW 38.9MHz K3953L
1581	2422 543 01359	Xtal 13.5MHz 12pF NX8045

⊣⊢

2002	2020 552 96507	10μF 10V
2003	2020 552 96507	10μF 10V
2005	2020 552 96618	1nF 10% 50V 0402
2006	2020 552 96618	1nF 10% 50V 0402
2008	2020 552 96618	1nF 10% 50V 0402
2012	3198 017 44740	470nF 10V 0603
2013	3198 035 04710	470pF 50V 0402
2014	3198 035 71040	100nF 10% 16V 0402
2015	3198 035 04710	470pF 50V 0402
2016	3198 017 44740	470nF 10V 0603
2018	3198 035 04710	470pF 50V 0402
2019	3198 017 44740	470nF 10V 0603
2021	3198 035 04710	470pF 50V 0402
2022	3198 017 44740	470nF 10V 0603
2024	3198 035 04710	470pF 50V 0402
2025	3198 017 44740	470nF 10V 0603
2027	3198 035 04710	470pF 50V 0402
2028	3198 017 44740	470nF 10V 0603
2030	2020 552 96618	1nF 10% 50V 0402
2031	2020 552 96618	1nF 10% 50V 0402
2032	2020 552 96618	1nF 10% 50V 0402
2033	2020 552 96618	1nF 10% 50V 0402
2037	2020 552 96507	10μF 10V
2038	2020 552 96507	10μF 10V
2039	2020 552 96507	10μF 10V
2040	2020 552 96507	10μF 10V
2045	3198 030 82280	2.2μF 20% 50V
2046	5322 124 41945	22μF 20% 35V
2047	4822 124 23002	10μF 20% 16V
2048	3198 035 71040	100nF 10% 16V 0402
2049	3198 035 71040	100nF 10% 16V 0402
2050	3198 035 71040	100nF 10% 16V 0402
2051	3198 035 71040	100nF 10% 16V 0402
2060	3198 035 71040	100nF 10% 16V 0402
2062	3198 035 71040	100nF 10% 16V 0402
2063	3198 035 71040	100nF 10% 16V 0402
2065	3198 035 71040	100nF 10% 16V 0402
2066	3198 035 71040	100nF 10% 16V 0402
2067	3198 035 71040	100nF 10% 16V 0402
2068	3198 035 71040	100nF 10% 16V 0402
2071	3198 035 71040	100nF 10% 16V 0402
2072	3198 035 71040	100nF 10% 16V 0402
2073	3198 035 71040	100nF 10% 16V 0402
2078	3198 035 71040	100nF 10% 16V 0402
2079	3198 035 71040	100nF 10% 16V 0402
2081	3198 035 71040	100nF 10% 16V 0402
2082	4822 126 14491	2.2μF -20+80% 10V 0805
2083	3198 035 71040	100nF 10% 16V 0402
2084	3198 035 71040	100nF 10% 16V 0402
2085	3198 035 71040	100nF 10% 16V 0402

2088	4822 126 14491	2.2µF -20+80% 10V 0805
2101	3198 035 71030	10nF 16V 0402
2102	3198 035 71030	10nF 16V 0402
2119	3198 035 71030	10nF 16V 0402
2126	2238 869 15101	100pF 5% 50V 0402
2127	3198 035 71040	100nF 10% 16V 0402
2128	3198 030 82280	2.2µF 20% 50V
2130	3198 035 71030	10nF 16V 0402
2134	3198 035 71040	100nF 10% 16V 0402
2135	4822 124 23002	10µF 20% 16V
2136	4822 124 23002	10µF 20% 16V
2137	4822 124 12095	100µF 20% 16V
2138	3198 035 71040	100nF 10% 16V 0402
2150	3198 035 71040	100nF 10% 16V 0402
2151	3198 030 82280	2.2µF 20% 50V
2152	3198 035 71040	100nF 10% 16V 0402
2154	4822 124 23002	10µF 20% 16V
2155	3198 035 71040	100nF 10% 16V 0402
2156	3198 035 71040	100nF 10% 16V 0402
2157	3198 035 71040	100nF 10% 16V 0402
2281	3198 035 71040	100nF 10% 16V 0402
2282	3198 035 71040	100nF 10% 16V 0402
2284	3198 035 71040	100nF 10% 16V 0402
2285	3198 035 71040	100nF 10% 16V 0402
2300	3198 035 71040	100nF 10% 16V 0402
2305	3198 017 41050	1µF 10V 0603
2307	2238 869 15101	100pF 5% 50V 0402
2308	2238 869 15101	100pF 5% 50V 0402
2310	4822 124 23002	10µF 20% 16V
2311	3198 035 71030	10nF 16V 0402
2317	2238 869 15101	100pF 5% 50V 0402
2318	2238 869 15101	100pF 5% 50V 0402
2321	3198 035 71030	10nF 16V 0402
2324	2238 869 15101	100pF 5% 50V 0402
2325	2238 869 75829	82pF 5% 50V 0402
2327	2238 869 15101	100pF 5% 50V 0402
2328	2238 869 15101	100pF 5% 50V 0402
2331	3198 035 71030	10nF 16V 0402
2341	3198 035 71040	100nF 10% 16V 0402
2342	3198 035 71040	100nF 10% 16V 0402
2343	3198 035 71040	100nF 10% 16V 0402
2344	3198 035 71040	100nF 10% 16V 0402
2345	3198 035 71040	100nF 10% 16V 0402
2346	3198 035 71040	100nF 10% 16V 0402
2350	4822 124 12095	100µF 20% 16V
2351	2238 869 15109	10pF 5% 50V 0402
2352	2238 869 15109	10pF 5% 50V 0402
2358	2238 869 15101	100pF 5% 50V 0402
2359	3198 035 71040	100nF 10% 16V 0402
2360	2238 869 15101	100pF 5% 50V 0402
2361	4822 126 14491	2.2µF -20+80% 10V 0805
2363	2238 869 15101	100pF 5% 50V 0402
2364	4822 126 14491	2.2µF -20+80% 10V 0805
2365	2238 869 15101	100pF 5% 50V 0402
2366	4822 126 14491	2.2µF -20+80% 10V 0805
2371	2020 552 96618	1nF 10% 50V 0402
2372	2020 552 96618	1nF 10% 50V 0402
2377	2020 552 96623	2.2nF 10% 50V 0402
2379	2020 552 96623	2.2nF 10% 50V 0402
2380	3198 035 04710	470pF 50V 0402
2384	2020 552 96618	1nF 10% 50V 0402
2386	2238 869 15109	10pF 5% 50V 0402
2395	3198 035 71030	10nF 16V 0402
2397	3198 035 71040	100nF 10% 16V 0402
2432	2020 552 96618	1nF 10% 50V 0402
2433	2020 552 96618	1nF 10% 50V 0402
2434	3198 017 44740	470nF 10V 0603
2435	3198 017 44740	470nF 10V 0603
2438	3198 017 44740	470nF 10V 0603
2439	3198 017 44740	470nF 10V 0603
2440	2020 552 96618	1nF 10% 50V 0402
2441	2020 552 96618	1nF 10% 50V 0402
2442	2020 552 96618	1nF 10% 50V 0402
2443	2020 552 96618	1nF 10% 50V 0402
2444	2020 552 96618	1nF 10% 50V 0402
2445	2020 552 96618	1nF 10% 50V 0402
2447	4822 124 12095	100µF 20% 16V
2450	3198 035 71030	10nF 16V 0402
2452	3198 035 71030	10nF 16V 0402
2454	4822 126 14491	2.2µF -20+80% 10V 0805
2457	4822 126 14491	2.2µF -20+80% 10V 0805
2461	3198 017 44740	470nF 10V 0603
2462	3198 017 44740	470nF 10V 0603
2480	3198 017 44740	470nF 10V 0603
2481	3198 017 44740	470nF 10V 0603
2483	2020 552 96618	1nF 10% 50V 0402
2484	4822 124 23002	10µF 20% 16V
2485	2020 552 96618	1nF 10% 50V 0402
2486	3198 035 71040	100nF 10% 16V 0402
2487	4822 124 23002	10µF 20% 16V
2488	4822 124 12095	100µF 20% 16V
2489	4822 124 12095	100µF 20% 16V
2514	2238 869 15189	18pF 5% 50V 0402
2516	2238 869 15189	18pF 5% 50V 0402
2525	3198 035 71040	100nF 10% 16V 0402
2546	3198 035 71040	100nF 10% 16V 0402
2557	2238 869 15101	100pF 5% 50V 0402
2571	3198 035 71040	100nF 10% 16V 0402
2581	4822 126 14519	22pF 5% 50V 0402
2582	4822 126 14519	22pF 5% 50V 0402
2583	3198 035 71040	100nF 10% 16V 0402
2584	3198 035 71040	100nF 10% 16V 0402
2600	3198 035 71040	100nF 10% 16V 0402
2601	3198 035 71040	100nF 10% 16V 0402
2604	3198 035 71040	100nF 10% 16V 0402
2607	3198 035 71040	100nF 10% 16V 0402
2609	3198 035 71040	100nF 10% 16V 0402
2611	3198 035 71040	100nF 10% 16V 0402
2612	3198 035 71040	100nF 10% 16V 0402
2615	3198 035 71040	100nF 10% 16V 0402
2618	3198 035 71040	100nF 10% 16V 0402
2620	3198 035 71040	100nF 10% 16V 0402
2622	3198 035 71040	100nF 10% 16V 0402
2623	3198 035 71040	100nF 10% 16V 0402
2628	3198 035 71040	100nF 10% 16V 0402
2629	3198 035 71040	100nF 10% 16V 0402
2630	3198 035 71040	100nF 10% 16V 0402
2633	3198 035 71040	100nF 10% 16V 0402
2634	3198 035 71040	100nF 10% 16V 0402
2638	3198 035 71040	100nF 10% 16V 0402
2644	5322 124 41945	22µF 20% 35V
2645	4822 124 23002	10µF 20% 16V
2651	2020 021 91679	100µF 20% 6.3V
2652	2020 552 96507	10µF 10V
2654	2020 552 96507	10µF 10V
2655	2020 552 96507	10µF 10V
2656	3198 035 71040	100nF 10% 16V 0402
2657	2238 869 15101	100pF 5% 50V 0402
2659	4822 126 13879	220nF 20% 16V
2730	3198 035 71040	100nF 10% 16V 0402
2731	3198 035 71040	100nF 10% 16V 0402
2732	3198 035 71040	100nF 10% 16V 0402
2733	3198 035 71040	100nF 10% 16V 0402
2734	3198 035 71040	100nF 10% 16V 0402
2792	3198 035 71040	100nF 10% 16V 0402
2793	3198 035 71040	100nF 10% 16V 0402
2918	2238 869 15101	100pF 5% 50V 0402
2919	2238 869 15101	100pF 5% 50V 0402
2920	2238 869 75829	82pF 5% 50V 0402
2932	2238 869 15101	100pF 5% 50V 0402
2933	2238 869 15101	100pF 5% 50V 0402
2935	2238 869 15101	100pF 5% 50V 0402
2936	2238 869 15101	100pF 5% 50V 0402
2938	2238 869 15101	100pF 5% 50V 0402
2948	2238 869 15189	18pF 5% 50V 0402
2949	2238 869 15189	18pF 5% 50V 0402
2950	2238 869 15101	100pF 5% 50V 0402
2951	2238 869 15101	100pF 5% 50V 0402
2962	2238 869 15101	100pF 5% 50V 0402
2967	2020 552 96618	1nF 10% 50V 0402
2968	2020 552 96618	1nF 10% 50V 0402
2975	2020 552 96793	4.7nF 10% 50V 0402
2976	2020 552 96793	4.7nF 10% 50V 0402
2977	2238 869 15101	100pF 5% 50V 0402
2978	2238 869 15101	100pF 5% 50V 0402
2979	2238 869 15101	100pF 5% 50V 0402

-WW-

3002	3198 031 04730	47Ω 5% 0402
3003	3198 031 04730	47Ω 5% 0402
3004	3198 031 04730	47Ω 5% 0402
3005	3198 031 04730	47Ω 5% 0402
3006	3198 031 04730	47Ω 5% 0402
3007	3198 031 04730	47Ω 5% 0402
3010	4822 117 13605	Jumper 0402
3011	4822 117 13605	Jumper 0402
3018	4822 117 11152	4.7Ω 5% 0.062W
3019	5322 117 11726	10Ω 5%
3022	3198 031 04730	47Ω 5% 0402
3024	3198 031 04730	47Ω 5% 0402
3026	3198 031 04730	47Ω 5% 0402
3027	3198 031 04730	47Ω 5% 0402
3060	4822 117 13602	2.2kΩ 5% 0.01W 0402
3061	4822 117 13602	2.2kΩ 5% 0.01W 0402
3062	3198 031 01810	180Ω 5% 0402
3063	3198 031 01810	180Ω 5% 0402
3066	4822 117 13602	2.2kΩ 5% 0.01W 0402
3067	4822 117 13548	1kΩ 5% 0402
3068	4822 117 13548	1kΩ 5% 0402
3101	4822 117 13602	2.2kΩ 5% 0.01W 0402
3103	3198 031 06820	6.8kΩ 5% 0.01W 0402
3104	4822 117 13602	2.2kΩ 5% 0.01W 0402
3106	3198 031 02730	27kΩ 5% 0402
3131	3198 031 04720	4.7kΩ 5% 0402
3132	4822 117 13545	100Ω 1% 0402
3138	3198 031 03910	390Ω 1% 0402
3150	3198 031 01820	1K8 5% 0402
3151	3198 031 01220	1K2 5% 0402
3152	3198 031 01820	1K8 5% 0402
3153	3198 031 01220	1K2 5% 0402
3154	3198 031 04730	47Ω 5% 0402
3155	3198 031 08210	820Ω 5% 0,5W
3281	4822 117 13548	1kΩ 5% 0402
3282	4822 117 13548	1kΩ 5% 0402
3283	4822 117 13548	1kΩ 5% 0402
3284	4822 117 13548	1kΩ 5% 0402
3302	3198 031 01220	1K2 5% 0402
3303	3198 031 06820	6.8kΩ 5% 0.01W 0402
3304	4822 117 13597	330Ω 5% 0402 0.01W
3305	4822 117 13548	1kΩ 5% 0402
3306	3198 031 03390	33Ω 1% 0402
3307	2322 705 87189	18Ω 5% 0402
3309	4822 051 30331	330Ω 5% 0.062W
3310	3198 031 01220	1K2 5% 0402
3311	3198 031 03390	33Ω 1% 0402
3312	3198 031 01220	1K2 5% 0402
3313	4822 117 13597	330Ω 5% 0402 0.01W
3316	2322 705 87189	18Ω 5% 0402
3318	3198 031 01220	1K2 5% 0402
3319	4822 051 30331	330Ω 5% 0.062W
3320	3198 031 01220	1K2 5% 0402
3321	3198 031 03390	33Ω 1% 0402
3322	3198 031 01220	1K2 5% 0402
3323	4822 117 13597	330Ω 5% 0402 0.01W
3325	3198 031 04720	4.7kΩ 5% 0402
3326	4822 117 13543	470Ω 5% 0402
3329	4822 051 30331	330Ω 5% 0.062W
3330	3198 031 01220	1K2 5% 0402
3331	3198 031 03390	33Ω 1% 0402
3332	3198 031 01220	1K2 5% 0402
3333	4822 117 13597	330Ω 5% 0402 0.01W
3334	3198 031 03390	33Ω 1% 0402
3335	3198 031 03390	33Ω 1% 0402
3336	3198 031 03390	33Ω 1% 0402
3337	3198 031 03390	33Ω 1% 0402
3338	2322 705 87189	18Ω 5% 0402
3340	4822 117 13548	1kΩ 5% 0402
3343	4822 117 13606	10kΩ 5% 0.01W 0402
3345	3198 031 06820	6.8kΩ 5% 0.01W 0402
3346	4822 117 13548	1kΩ 5% 0402
3347	4822 117 13601	22kΩ 5% 0402
3348	4822 117 13601	22kΩ 5% 0402
3349	3198 031 04730	47Ω 5% 0402
3350	4822 117 13596	220Ω 5% 0.01W 0402
3351	4822 117 13548	1kΩ 5% 0402
3352	3198 031 04730	47Ω 5% 0402
3353	4822 117 13606	10kΩ 5% 0.01W 0402
3354	4822 117 13606	10kΩ 5% 0.01W 0402
3355	4822 117 13601	22kΩ 5% 0402
3356	3198 031 08210	820Ω 5% 0,5W
3357	4822 117 13601	22kΩ 5% 0402
3358	5322 117 11726	10Ω 5%
3361	4822 117 13605	Jumper 0402
3364	2322 705 70124	120kΩ 5% 0402
3365	4822 117 13605	Jumper 0402
3366	4822 117 13602	2.2kΩ 5% 0.01W 0402
3367	4822 117 13548	1kΩ 5% 0402
3368	3198 031 06830	68kΩ 5% 0.01W 0402
3371	4822 117 13548	1kΩ 5% 0402
3372	2322 705 70155	1.5MΩ 5% 0402
3373	4822 117 13606	10kΩ 5% 0.01W 0402
3374	3198 031 02720	2.7kΩ 5% 0.01W 0402
3375	3198 031 02720	2.7kΩ 5% 0.01W 0402
3376	4822 117 13606	10kΩ 5% 0.01W 0402
3377	3198 031 02250	2.2MΩ 5% 0402
3378	3198 031 03340	330kΩ 5% 0402
3380	4822 117 13606	10kΩ 5% 0.01W 0402
3382	4822 117 13548	1kΩ 5% 0402
3384	4822 117 13606	10kΩ 5% 0.01W 0402
3385	3198 031 04730	47Ω 5% 0402
3386	3198 031 02730	27kΩ 5% 0402
3390	4822 117 13548	1kΩ 5% 0402
3391	3198 031 03930	39kΩ 5% 0402
3392	3198 031 04730	47Ω 5% 0402
3393	3198 031 03320	3.3kΩ 5% 0402
3395	4822 117 13606	10kΩ 5% 0.01W 0402
3396	4822 117 13543	470Ω 5% 0402
3397	4822 117 13543	470Ω 5% 0402
3398	4822 117 13545	100Ω 1% 0402
3445	3198 031 04730	47Ω 5% 0402
3446	3198 031 05630	56kΩ 5% 0402
3447	3198 031 05630	56kΩ 5% 0402
3448	3198 031 01220	1K2 5% 0402
3449	3198 031 01520	1.2kΩ 5% 0.01W 0402
3450	3198 031 01220	1K2 5% 0402
3452	3198 031 01220	1K2 5% 0402
3453	3198 031 04730	47Ω 5% 0402
3454	3198 031 05630	56kΩ 5% 0402
3455	3198 031 05630	56kΩ 5% 0402
3456	3198 031 01220	1K2 5% 0402

3457	3198 031 01520	1.2kΩ 5% 0.01W 0402
3480	3198 031 02720	2.7kΩ 5% 0.01W 0402
3481	3198 031 02720	2.7kΩ 5% 0.01W 0402
3482	3198 031 04720	4.7kΩ 5% 0402
3483	3198 031 08220	8.2kΩ 5% 0.5W
3484	3198 031 04720	4.7kΩ 5% 0402
3485	3198 031 08220	8.2kΩ 5% 0.5W
3501	4822 117 13606	10kΩ 5% 0.01W 0402
3502	4822 117 13606	10kΩ 5% 0.01W 0402
3503	4822 117 13606	10kΩ 5% 0.01W 0402
3504	4822 117 13606	10kΩ 5% 0.01W 0402
3507	4822 117 13606	10kΩ 5% 0.01W 0402
3508	3198 031 04720	4.7kΩ 5% 0402
3509	3198 031 02720	2.7kΩ 5% 0.01W 0402
3510	3198 031 02720	2.7kΩ 5% 0.01W 0402
3511	4822 117 13546	47Ω 5% 0402
3512	4822 117 13546	47Ω 5% 0402
3513	3198 031 02720	2.7kΩ 5% 0.01W 0402
3515	3198 031 02720	2.7kΩ 5% 0.01W 0402
3518	4822 117 13601	22kΩ 5% 0402
3523	4822 117 13606	10kΩ 5% 0.01W 0402
3530	4822 117 11297	100kΩ 5% 0.1W
3547	3198 031 03390	33Ω 1% 0402
3550	3198 031 04720	4.7kΩ 5% 0402
3557	4822 117 13546	47Ω 5% 0402
3563	4822 117 13606	10kΩ 5% 0.01W 0402
3564	4822 117 13606	10kΩ 5% 0.01W 0402
3565	4822 117 13606	10kΩ 5% 0.01W 0402
3570	4822 117 13602	2.2kΩ 5% 0.01W 0402
3571	3198 031 02720	2.7kΩ 5% 0.01W 0402
3572	4822 117 13606	10kΩ 5% 0.01W 0402
3581	4822 117 13545	100Ω 1% 0402
3582	4822 117 13606	10kΩ 5% 0.01W 0402
3583	3198 031 01830	18kΩ 5% 0.01W 0402
3586	4822 117 13601	22kΩ 5% 0402
3590	4822 117 13548	1kΩ 5% 0402
3651	5322 117 13036	1.2kΩ 1% 0.063W 0603
3652	5322 117 13052	2.7kΩ 1% 0.063W 0603
3737	3198 031 03390	33Ω 1% 0402
3904	4822 117 13605	Jumper 0402
3909	4822 117 13545	100Ω 1% 0402
3911	4822 117 13545	100Ω 1% 0402
3918	4822 117 13545	100Ω 1% 0402
3919	4822 117 13545	100Ω 1% 0402
3928	4822 117 13545	100Ω 1% 0402
3929	4822 117 13545	100Ω 1% 0402
3936	4822 117 13545	100Ω 1% 0402
3938	4822 117 13545	100Ω 1% 0402
3950	4822 117 13545	100Ω 1% 0402
3951	4822 117 13545	100Ω 1% 0402
3962	4822 117 13545	100Ω 1% 0402
3963	4822 117 13545	100Ω 1% 0402
3964	4822 117 13545	100Ω 1% 0402
3975	4822 117 13545	100Ω 1% 0402
3976	4822 117 13545	100Ω 1% 0402
3977	4822 117 13545	100Ω 1% 0402
3978	4822 117 13545	100Ω 1% 0402
3979	4822 117 13545	100Ω 1% 0402
3980	4822 117 13545	100Ω 1% 0402
4xxx	4822 117 13605	Jumper 0402

-∿-

5060	2422 549 44197	Bead 220Ω at 100MHz
5061	2422 549 44197	Bead 220Ω at 100MHz
5062	2422 549 44197	Bead 220Ω at 100MHz
5063	2422 549 44197	Bead 220Ω at 100MHz
5101	4822 157 71303	0.39μH 10% 0805
5102	2422 549 44197	Bead 220Ω at 100MHz
5112	2422 549 44197	Bead 220Ω at 100MHz
5134	2422 549 44197	Bead 220Ω at 100MHz
5135	2422 549 44197	Bead 220Ω at 100MHz
5150	2422 549 44197	Bead 220Ω at 100MHz
5151	2422 549 44197	Bead 220Ω at 100MHz
5152	2422 549 44197	Bead 220Ω at 100MHz
5281	2422 549 44197	Bead 220Ω at 100MHz
5282	2422 549 44197	Bead 220Ω at 100MHz
5283	2422 549 44197	Bead 220Ω at 100MHz
5285	2422 549 44197	Bead 220Ω at 100MHz
5300	2422 549 44197	Bead 220Ω at 100MHz
5307	4822 051 20008	Jumper 0805
5317	4822 051 20008	Jumper 0805
5327	4822 051 20008	Jumper 0805
5328	4822 051 20008	Jumper 0805
5342	2422 549 44197	Bead 220Ω at 100MHz
5343	2422 549 44197	Bead 220Ω at 100MHz
5344	2422 549 44197	Bead 220Ω at 100MHz
5345	2422 549 44197	Bead 220Ω at 100MHz
5450	2422 549 44197	Bead 220Ω at 100MHz
5452	2422 549 44197	Bead 220Ω at 100MHz
5480	2422 549 44197	Bead 220Ω at 100MHz
5570	2422 549 44197	Bead 220Ω at 100MHz
5583	2422 549 44197	Bead 220Ω at 100MHz
5600	4822 157 11716	Bead 30Ω at 100MHz
5601	2422 549 44197	Bead 220Ω at 100MHz
5651	2422 535 94134	10μH 20% 0805
5654	4822 157 11258	1μH 20% NLC322522T
5659	4822 157 71334	0.68μH
5730	2422 549 44197	Bead 220Ω at 100MHz
5731	2422 549 44197	Bead 220Ω at 100MHz
5792	2422 549 44197	Bead 220Ω at 100MHz

-▷|-

6101	4822 130 11525	1SS356
6301	4822 130 11397	BAS316
6327	9322 102 64685	UDZ2.7B
6341	4822 130 11397	BAS316
6353	5322 130 34337	BAV99
6365	5322 130 34337	BAV99
6367	9340 548 67115	PDZ22B
6368	4822 130 11397	BAS316
6381	5322 130 34337	BAV99
6382	4822 130 11594	BZX284-C47
6384	9340 548 67115	PDZ22B
6385	4822 130 11397	BAS316
6397	9340 548 69115	PDZ27B
6398	4822 130 11397	BAS316
6480	9340 548 61115	PDZ12B
6481	9340 548 61115	PDZ12B
6651	9322 128 70685	SMSS14

⊗▭

7060	9340 425 30115	BC847BPN
7062	4822 130 60373	BC856B
7063	4822 130 60373	BC856B
7100	9352 712 54557	PNX3000HL/N1
7101	3198 010 42310	BC847BW
7150	9340 425 20115	BC847BS
7300	9352 735 54557	PNX3002E/N302
7301	4822 130 60373	BC856B
7302	4822 130 60373	BC856B
7303	4822 130 60373	BC856B
7304	3198 010 42310	BC847BW
7310	9340 425 30115	BC847BPN
7320	9340 425 30115	BC847BPN
7330	9340 425 30115	BC847BPN
7346	4822 130 60373	BC856B
7356	4822 130 60373	BC856B
7365	5322 130 60159	BC846B
7382	4822 130 60373	BC856B
7383	9340 425 30115	BC847BPN
7393	3198 010 42310	BC847BW
7432	9340 425 30115	BC847BPN
7433	9340 425 30115	BC847BPN
7480	4822 209 33165	TDA1308T/N1
7525	9322 130 41668	M24C64-WMN6
7581	9352 691 56115	NE56610-45GW
7650	9322 170 61668	CS51033YDR8
7651	9322 170 87668	STS5PF30L
7730	9322 180 88668	K4S641632F-TC75
7790	9322 199 76668	M58LW032C90N1

Side I/O Panel [D]

Various

0240	2422 025 12485	Connector 11p m
0241	4822 267 10734	Connector 5p m
0242	4822 267 10734	Connector 5p m
1254	4822 267 31014	Socket headphone
1255	4822 265 11606	Connector 3p
1256	2422 026 04926	Socket SVHS 4p f

-||-

2286	4822 122 33642	150pF 5% 50V
2288	4822 122 33642	150pF 5% 50V
2292	5322 122 32311	470pF 10% 100V
2294	5322 122 32311	470pF 10% 100V
2296	4822 122 30103	22nF 80% 63V
2297	4822 122 30103	22nF 80% 63V

-WW-

3285	4822 116 52201	75Ω 5% 0.5W
3286	4822 116 52176	10Ω 5% 0.5W
3287	4822 116 52201	75Ω 5% 0.5W
3288	4822 116 52176	10Ω 5% 0.5W
3289	4822 116 52249	1.8kΩ 5% 0.5W
3291	4822 050 11002	1kΩ 1% 0.4W
3292	4822 117 10834	47kΩ 1% 0.1W
3293	4822 050 11002	1kΩ 1% 0.4W
3294	4822 117 10834	47kΩ 1% 0.1W
3295	4822 116 52276	3.9kΩ 5% 0.5W
3296	4822 117 10833	10kΩ 1% 0.1W
3297	4822 117 10833	10kΩ 1% 0.1W
4xxx	4822 051 20008	Jumper 0805

-▷|-

6291	9340 548 61115	PDZ12B
6292	9340 548 61115	PDZ12B
6293	9340 548 61115	PDZ12B
6294	9340 548 61115	PDZ12B
6296	9340 548 61115	PDZ12B
6297	9340 548 61115	PDZ12B

Top Control Panel [E]

Various

0135	3104 311 04671	Cable 3p/1200/3p
0215	2422 025 16601	Connector 3p m
1091	4822 276 13775	Switch
1092	4822 276 13775	Switch
1093	4822 276 13775	Switch
1094	4822 276 13775	Switch

-||-

2010	4822 122 33177	10nF 20% 50V

-WW-

3088	4822 051 30008	Jumper 0603
3089	4822 051 30008	Jumper 0603
3091	4822 051 30561	560Ω 5% 0.062W
3092	4822 051 30391	390Ω 5% 0.062W
3093	4822 051 30561	560Ω 5% 0.062W
3094	4822 051 30271	270Ω 5% 0.062W
3095	4822 051 30332	3.3kΩ 5% 0.062W
3096	4822 051 30152	1.5kΩ 5% 0.062W
4092	4822 051 30008	Jumper 0603

-▷|-

6092	4822 130 10654	BAT254

CRT Panel [F]

Various

0032	4822 492 70788	IC clamp
1298	2422 500 80063	Connector CRT 10p f
1424	2422 025 11244	Connector 7p m
1434	4822 267 10973	Connector 1p m
1483	4822 267 10735	Connector 3p m
1940	2422 025 12485	Connector 11p m
8483	3104 311 03111	Cable 3p/340/3p ferrite

-||-

2300	4822 124 40764	22μF 100 V
2301	4822 124 40196	220μF 20% 16V
2304	4822 121 41856	22nF 5% 250V
2306	2238 586 59812	100nF 20-80% 50V 0603
2307	4822 121 41856	22nF 5% 250V
2309	3198 017 42230	22nF 50V
2313	4822 124 12373	47μF 20% 250V
2315	5322 126 11583	10nF 10% 50V 0603
2316	4822 121 40518	100nF 10% 250V
2318	5322 122 32654	22nF 10% 63V
2319	4822 122 30043	10nF 80% 63V
2320	2238 586 59812	100nF 20-80% 50V 0603
2324	5322 121 44356	4.7nF 5% 2kV
2325	2238 586 59812	100nF 20-80% 50V 0603
2330	4822 126 13879	220nF 20% 16V
2338	2238 786 19856	330nF 16V 0603
2409	4822 051 30008	Jumper 0603
2410	3198 017 44740	470nF 10V 0603
2411	4822 126 14585	100nF 10% 50V
2420	4822 051 30008	Jumper 0603

-WW-

3300	4822 052 10109	10Ω 5% 0.33W
3301	4822 053 12103	10K00 5% 3W
3302	4822 051 30681	680Ω 5% 0.062W

3303	4822 051 30682	6.8kΩ 5% 0.062W
3304	4822 051 10102	1kΩ 2% 0.25W
3306	4822 117 13608	4.7Ω 5% 0603 0.62W
3307	4822 051 30109	10Ω 5% 0.062W
3308	4822 051 30563	56kΩ 5% 0.062W
3310	4822 051 10102	1kΩ 2% 0.25W
3311	4822 051 30181	180Ω 5% 0.062W
3312	4822 051 30222	2.2kΩ 5% 0.062W
3316	4822 051 30563	56kΩ 5% 0.062W
3318	4822 117 12971	15Ω 5% 0.62W 0603
3319	4822 051 30102	1kΩ 5% 0.062W
3323	4822 050 24708	4.7Ω 1% 0.6W
3324	4822 051 30221	220Ω 5% 0.062W
3329	4822 050 24708	4.7Ω 1% 0.6W
3334	4822 050 11002	1kΩ 1% 0.4W
3335	4822 051 30271	270Ω 5% 0.062W
3336	4822 051 30271	270Ω 5% 0.062W
3337	4822 051 30271	270Ω 5% 0.062W
3338	3198 013 01020	1kΩ 2% 0.5W
3339	3198 013 01020	1kΩ 2% 0.5W
3340	3198 013 01020	1kΩ 2% 0.5W
3341	2306 207 03151	150Ω 5% 0.5W
3342	4822 116 83883	470Ω 5% 0.5W
3345	4822 116 52191	33Ω 5% 0.5W
3347	3198 013 01520	1.5kΩ 2% 0.5W
3349	3198 013 01020	1kΩ 2% 0.5W
3350	4822 116 83883	470Ω 5% 0.5W
3351	4822 116 83883	470Ω 5% 0.5W
3352	4822 116 83883	470Ω 5% 0.5W
3354	4822 051 30222	2.2kΩ 5% 0.062W
3355	4822 117 13608	4.7Ω 5% 0603 0.62W
3356	4822 051 10102	1kΩ 2% 0.25W
3357	4822 117 13608	4.7Ω 5% 0603 0.62W
3370	4822 117 13016	VDR 1mA/50V
3371	4822 051 30472	4.7kΩ 5% 0.062W
3401	4822 116 52175	100Ω 5% 0.5W
3403	4822 052 11228	2R20 5% 0,5W
3404	4822 052 11228	2R20 5% 0,5W
3410	4822 051 30103	10kΩ 5% 0.062W
3411	4822 051 30103	10kΩ 5% 0.062W
3412	2322 750 61509	15Ω 5% 1206 fusible
3413	4822 051 30181	180Ω 5% 0.062W
3414	4822 051 30109	10Ω 5% 0.062W
3417	4822 051 30109	10Ω 5% 0.062W
3418	4822 051 30181	180Ω 5% 0.062W
3420	4822 051 30008	Jumper 0603
3427	4822 051 30008	Jumper 0603
3999	4822 051 30152	1.5kΩ 5% 0.062W
9402	4822 051 20008	Jumper 0805
9405	4822 051 30008	Jumper 0603

∼

5300	3104 308 20571	Transf. S13974-03
5400	4822 157 11869	33µH 10%
5401	4822 157 71334	0.68µH

⊣▶⊢

6300	4822 130 83757	BAS216
6301	4822 051 20008	Jumper 0805
6305	9340 553 52115	BAS321
6306	9340 553 52115	BAS321
6307	9340 553 52115	BAS321
6310	4822 130 11397	BAS316
6311	4822 130 11397	BAS316
6312	4822 130 11397	BAS316
6313	4822 130 11397	BAS316
6314	4822 130 11397	BAS316

⊗▭

7300	5322 130 42718	BFS20
7301	5322 130 42718	BFS20
7302	5322 130 62804	BCP53
7303	5322 130 63033	BCP56
7304	4822 130 60383	BF824
7307	9352 561 40112	TDA6108
7308	5322 130 60159	BC846B

DC Shift Panel [G]

Various

0317	4822 265 20723	Connector 2p m
0318	4822 265 20723	Connector 2p m
1430	2422 086 10581	Fuse 400mA 65V
8317	3104 311 01421	Cable 2p3/220/2p3 Wh

⊣⊢

2430	4822 122 31177	470pF 10% 500V
2431	4822 122 31177	470pF 10% 500V

∼

5430	3128 138 38911	DC-shift coil CU15

⊣▶⊢

6432	9340 317 00133	BYD33V
6433	9340 317 00133	BYD33V

DAF + 2nd order [I]

Various

0034	3104 304 23041	DAF bracket EMGS
1417	4822 265 20723	Connector 2p m
1418	2422 025 16374	Connector 2p m
1419	4822 265 20723	Connector 2p m
1497	4822 267 10973	Connector 1p m
8418	3104 311 01951	Cable 2p3/560/2p4 Bk

⊣⊢

2800	2222 375 90498	470pF 5% 2kV
2821	2222 479 90166	68nF 5% 400V
2890	2222 375 90276	220pF 5% 2kV

-WW-

3898	4822 116 21211	VDR 420V
3899	4822 116 21211	VDR 420V

∼

5800	2422 531 02437	Transformer S21975-03
5801	2422 531 02435	Transformer C948-02
5801	8228 001 34391	Driver Transformer CU15

Front Interface Panel [J]

Various

0157	3104 311 02421	Cable 5p/480/5p
0177	3104 311 03011	Cable 2p/340/2p Bk
0201	2422 025 16268	Connector 2p m
0202	2422 025 16268	Connector 2p m
0203	2422 025 06353	Connector 5p m
1910	9322 127 54667	TSOP1836UH1
1951	2422 128 02972	Mains switch

⊣⊢

2930	4822 124 41584	100µF 20% 10V

-WW-

3957	4822 053 21335	3.3MΩ 5% 0.5W
3966	4822 053 21335	3.3MΩ 5% 0.5W
3978	4822 051 30008	Jumper 0603
3981	4822 051 30681	680Ω 5% 0.062W
3982	4822 116 52219	330Ω 5% 0.5W
4903	4822 051 30008	Jumper 0603

⊣▶⊢

6901	9322 050 99682	LTL-10224WHCR

11. Revision List

First release